DOCUMENT RESUME

ED 074 069 SP 006 305

AUTHOR	Lueders-Salmon, Erika
TITLE	The Active Classroom: A Comparison of Team-Teaching and Self-Contained-Classroom Schools. Technical Report No. 31.
INSTITUTION	Stanford Univ., Calif. Stanford Center for Research and Development in Teaching.
SPONS AGENCY	Office of Education (DHEW), Washington, D.C. Research and Development Centers Branch.
REPORT NO	TR-31
BUREAU NO	OEC-6-10-078
PUB DATE	72
NOTE	106p.
EDRS PRICE	MF-$0.65 HC-$6.58
DESCRIPTORS	*Class Management; *Classroom Environment; Elementary Education; Open Education; *Open Plan Schools; *Self Contained Classrooms; *Team Teaching

ABSTRACT

This study assessed the environment children experience, rather than their academic achievement or personal adjustment. Measures of child activity were related to type of school, architecture, size of teaching team, a measure of teacher attitude, and other variables. A new instrument was developed for scoring the activities children were engaged in, the groups children worked in, and the amount children moved. An original questionnaire measured teacher and principal "control orientation" in order to determine respondents' beliefs about formal control of children. A sample of 22 collegiate teams in 11 open-space schools and 11 teachers in 7 schools with self-contained classrooms was observed. Results indicated that structure, as well as ideology, has major effects on the child's environment in elementary school; in particular, children in open-space schools were much more active than those in self-contained classrooms. (A 46-item bibliography and appendixes, with related research material, are included.) (Author/MJM)

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Technical Report No. 31

THE ACTIVE CLASSROOM: A COMPARISON OF TEAM-TEACHING AND SELF-CONTAINED-CLASSROOM SCHOOLS

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1972

SP 006 305

Published by the Stanford Center for Research and Development in Teaching, supported in part as a research and development center by funds from the United States Office of Education, Department of Health, Education, and Welfare. The opinions expressed in this publication do not necessarily reflect the position or policy of the Office of Education and no official endorsement by the Office of Education should be inferred. (Contract No. OEC-6-10-078, Component 2A.)

This Technical Report is based on a doctoral dissertation entitled "Team Teaching and the 'Active' Classroom: A Comparative Study of the Impact of Self-Contained Classrooms and Open-Space Team-Teaching Schools on Classroom 'Activity,'" Stanford University, 1971. Copyright for the dissertation had been claimed in the name of Erika Lueders-Salmon, but has been abandoned. A paper also based on the dissertation was presented at the Annual Meeting of the American Educational Research Association, Chicago, April 1972.

Erika Lueders-Salmon was a Research Assistant at the Stanford Center for Research and Development in Teaching when this study was conducted. A grant from Proctor and Gamble paid for part of the observations. The remainder of the study was financed by the Center.

The author wishes to thank Janet Ziebarth, Beth Feinberg, and Jo-Ann Intili, who served as observers, and Chris Cozzens, who helped develop the observation instrument.

Introductory Statement

The Center's mission is to improve teaching in American schools. Too many teachers still employ a didactic style aimed at filling passive students with facts. The teacher's environment often prevents him from changing his style, and may indeed drive him out of the profession. And the children of the poor typically suffer from the worst teaching.

The Center uses the resources of the behavioral sciences in pursuing its objectives. Drawing primarily upon psychology and sociology, but also upon other behavioral science disciplines, the Center has formulated programs of research, development, demonstration, and dissemination in three areas. Program 1, Teaching Effectiveness, is now developing a Model Teacher Training System that can be used to train both beginning and experienced teachers in effective teaching skills. Program 2, The Environment for Teaching, is developing models of school organization and ways of evaluating teachers that will encourage teachers to become more professional and more committed. Program 3, Teaching Students from Low-Income Areas, is developing materials and procedures for motivating both students and teachers in low-income schools.

This study, done under the Environment for Teaching program, attempted to assess the environment that children experience in elementary school. Using data collected from both open-space and self-contained-classroom schools, the study related measures of children's activity to type of school architecture, size of teaching team, one measure of teacher attitude, and other variables.

Abstract

Earlier investigations have studied teachers from collegial teams in open-space schools; this investigation extended the earlier work to observations of elementary school children. The study was a first attempt to assess the environment children experience, rather than their academic achievement or personal adjustment. It was planned to be a basis for future research.

Of chief interest was the classroom that gives the child choice, opportunities to work independently, and encouragement to behave actively; a classroom of this sort is described as an "Active Classroom." The study related measures of child Activity to type of school architecture (open-space or self-contained classrooms), size of teaching team, a measure of teacher attitude, and other variables.

A new instrument was developed for scoring the activities children were engaged in, the groups children worked in, and the amount children moved. Four basic measures were used to characterize an Active Classroom. They were (1) the amount of movement not specifically directed by the teacher ("Movement"); (2) a negative item, the proportion of time children spent waiting, listening, or passive ("Passivity"); (3) a negative item, the proportion of time children spent in large groups ("Large Groups"); and (4) the proportion of time children spent in educational games, cooperative work, and doing, when not in large groups ("Doing"). All 4 indicators of the Active Classroom gave consistent results--though all but the last were taken independently of each other--reinforcing the significance that could be attached to the findings.

An original questionnaire measured teacher and principal "Control Orientation" in order to determine respondents' beliefs about formal control of children.

A sample of 22 collegial teams in 11 open-space schools and 11 teachers in 7 self-contained-classroom schools was observed. All schools were in middle-class neighborhoods. In each self-contained classroom or team area 15 or more observations were taken (5 observations each in reading, mathematics, and social studies or science). The unit of analysis was the team of teachers in an open-space school and the single teacher in a self-contained classroom.

It was predicted that the open-space classrooms would be more Active than self-contained classrooms. Statistically significant differences were found on all 4 measures of Activity, as expected. Among the 4 measures, it was most striking that there was approximately twice as much Movement in the open-space schools as in the self-contained classrooms. Possible causes of this effect include the ability of teams to share their planning tasks and so to plan for a greater variety of

activities; the greater space in open-space classrooms, which encouraged children to move and teachers to let them move; and the carpeting in open-space schools, which reduced noise and made movement less obtrusive.

It was predicted that teachers with informal Control Orientation would have more Active classrooms. This was found to be true, particularly on the measures of Movement and Passivity. The scores on the Control Orientation index did not differ significantly between the teachers in the two types of school. The Control Orientation of principals was unrelated to the measures of Movement and Passivity, and only slightly related to those for Doing and the use of Large Groups.

In self-contained classrooms the higher grade levels were less Active than lower grade levels, presumably owing in part to greater emphasis on curriculum. In the open-space schools (after controlling for other variables) the higher grade levels were more Active than lower grade levels, particularly as measured by Movement and Passivity. This finding was not predicted, but it may be related to lesser emphasis on curriculum combined with recognition by teachers of the greater maturity of older children.

It was predicted that because of organizational problems large teams would break up into smaller subteams. This hypothesis was confirmed.

It was predicted that teams of three and four members would have more Active classrooms than teams of two members. This was found to be true, particularly with regard to Doing and Large Group work. It is suggested that this effect is caused by the ability of larger teams to plan more activities for the children.

It was found that teams teaching two grade levels had less Active classrooms than those with just one, perhaps because of a lack of planning for the ungraded situation by the teams sampled.

The remaining predictions concerned the level of teacher cooperation in the open-space schools. The measures of teacher cooperation used proved inadequate to test these hypotheses. The one measure that was usable, however--teachers' reports of "hours spent in cooperative teaching"--correlated highly with teacher Control Orientation, as predicted. The more informally oriented teachers reported more time spent in cooperative teaching than their more formally oriented colleagues.

The research confirmed that structure, as well as ideology, has major effects on the child's environment in elementary school; in particular, children in open-space schools were much more Active than those in self-contained classrooms.

A particular value of the study is that consistent quantitative measures describing one aspect of the classroom environment were developed, and can be used in future research.

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CHAPTER I

INTRODUCTION

Background of the Study

Principals of elementary schools show special pride and satisfaction when they can announce "we are team teaching in our school." Team teaching, one quickly discovers, has many meanings and definitions; the range goes from teaching of children by a group of adults who cooperate continuously and share their pupils as circumstances dictate to mere departmentalization, where teachers exchange classes for certain subjects.

Team teaching itself is not a new discovery. In the late 1930's a well-formulated cooperative group system, similar to some of today's team-teaching activities, was unsuccessful (Shaplin, 1964). However, since the late 1950's many different schemes have succeeded, and hypotheses about the possible pros and cons of team teaching, most of them speculative, have been put forth freely. Descriptions of different practices are manifold. Guidelines that can be followed when a school contemplates introducing team teaching have been described by Lobb (1964). He suggests that the decision whether to create hierarchical teams or collegial teams might be influenced by the way the school is organized before the change. In a relatively rigid organization the hierarchical team is likely to succeed, whereas in a more informal situation the collegial team might be more successful. From field observations Lobb finds that the team sizes vary a great deal, but he concludes that teams with three to six members seem to work best. He describes different bases used for teaming: for example, the individual competencies of the members in teaching different subject matter (inter-subject teams) and the competencies of the members in different teaching styles (intra-subject teams). Further, Lobb describes teams responsible for only one grade level and those responsible for several grade levels. The common characteristic of all these different teams is that their members cooperate in some way in their teaching task.

There have been separate studies of hierarchical teams and collegial teams (Bair & Woodward, 1964; Brunetti, 1971; Lopossa, 1971; Meyer et al.,

1971; Molnar, 1971; Shaplin & Olds, 1964). Lopossa's was the only one to compare the two types of team structure in an experimental study. She found that in trying to solve a specially assigned problem, more disagreeing behavior and tension was exhibited by larger teams (larger than four) than by smaller ones and by teams with leaders than by teams without leaders. Studies of collegial teams have been conducted in open-space schools, where architectural changes add new dimensions to the teaching task. The teachers in a pod must cooperate to some degree; organizational patterns have to be developed to prevent teachers from disturbing one another. But, more in line with the purpose of the building, teachers can create organizational patterns that will enable them to share the teaching task.

Earlier studies have been concerned mainly with the teacher in this new situation; the impact of the student has been assessed less often. The few studies that have been done so far have used small samples, some of them without adequate control groups. Most studies were concerned primarily with results on standard academic achievement tests and personal adjustment tests (Bair & Woodward, 1964; Heather, 1964). For example, Lambert et al. (1964) analyzed classroom interaction in addition to measuring academic achievement and personal adjustment. The study was done over a two-year period with newly formed hierarchical teams and control groups. The two teams were divided into master teachers and interns; each team was responsible for three grade levels. The control groups were six self-contained classrooms of grades one through six in the same school as the teams. A few specialists came in to help these self-contained-classroom teachers. The others were completely self-contained classrooms of grades one through six in a nearby school. The results of the study were highly sensitive to the specifics of the two teams in the study. For example, the change of the master teacher in the second year in one team seem to be reflected in the data. In only a few instances did the teams differ significantly from the control groups.

Aims of the Study

This study focused on two very different school organizations: the traditional self-contained-classroom school and the open-space team-teaching

school. The traditional school, whose architectural structure is often quite reasonably likened to an egg-crate, does not need to be described; the long hallways with classrooms to each side should be familiar to all readers. The open-space school appears in many variations of one basic plan: rooms big enough to hold from two to 30 standard-size classes. These rooms, usually called "pods," have varied shapes. Some have permanent interior dividers; some are like domes, without any inside structural supports to act as dividers; some have one large learning center or library as the core; others leave the central space for teachers to use as they please. In all of the pods visited for this study, the teachers either formed a single team or divided into subteams. In no case was there no cooperation among the teachers at all; what was considered "teaming," however, differed greatly.

Visits to open-space team-teaching schools yielded the impression that children moved around more freely and that there was a generally higher level of activity than in the traditional schools. In this study we were interested in documenting these impressions and also in finding some explanation for them. We were, of course, particularly interested in identifying differences between open-space team-teaching schools and self-contained-classroom schools, but examined other structural variables (e.g., the size of the teaching teams) as well.

Differences in the environments which students experience could, however, also be the result of different teacher attitudes toward teaching and the teacher's concept of a desirable classroom environment. Specifically, one could expect teachers in schools with "new" types of organization to also have "new" attitudes. An original measure of teacher attitude was therefore developed in an attempt to determine this effect, and control for it.

This study did not concern itself with the issue whether the classroom should give the child an active role where he can learn from his own independent behavior, though this would be argued by many educators, for example, Jackson, Silberman, and Holt. Nor did it assess differences in the school environment as experienced by the student in terms of aca-

demic achievement or personal adjustment. The study's chief interest was to quantify and then explain the classroom that gives the child choices, opportunities to work independently, and encouragement to behave actively. In this report such an environment is described as an "Active Classroom."

CHAPTER II

THE RESEARCH PROBLEM AND STUDY DESIGN

The study could not be based on available theories and was itself a pilot study for further research. The reasoning behind the study, the study design, and the sampling of participants for the study are described below.

Theoretical Framework

Jackson (1968) convincingly describes the need for the teacher in a self-contained classroom to impose rules and regulations on the children's activities. It is difficult for one adult to conduct and supervise an Active Classroom of 20 to 30 children. Even though we all know the teacher whose classroom is buzzing, where no boredom can be found, and where no orders are necessary, we also know that teachers who create this kind of environment are rare. To conduct such a classroom, in which children can choose from a range of purposeful activities, demands a great deal of preparation by the teacher. To guide children to cooperate on projects and use each other as resources demands that the teacher spend time with small groups while other children are involved in different activities. If children are working on different tasks at the same time, it is to be expected that they will move around, adding to the confusion of an Active Classroom. Planning for such an Active Classroom can be described as a complex task.

In the business world and in universities, complex tasks are usually not solved by one expert working in isolation, but typically by groups of people, such as research teams, pooling ideas and expertise. We expected that similar organizational help could be utilized by teachers--that in open-space team-teaching schools more people could share the planning of instruction and utilize each other's ideas. It seemed likely that an increase in the size of the planning group of teachers would have a positive effect on resolving the task of planning for an Active Classroom.

Even if a teacher has many instructional aids available and can share with others in the preparation of curriculum units, he will still not find it easy to supervise many diverse activities and small groups

at once. Again, it seemed likely that an increase in the size of the supervising staff would help reduce the complexity of this problem. If several teachers and their classes shared one room, the teachers might share responsibility for all the students and the management of the enlarged classroom. It was expected that this would make it easier to manage an Active Classroom. The teachers could limit the scope of activities each had to supervise; they could alter the size of the group they worked with to fit the task (e.g., children playing games, listening to records, or reading need fewer teachers than do children who struggle with the concept of fractions); and they could let the children move in a larger area, since there would be other adults in the room.

Such a group of teachers who planned together and shared the responsibilities of the classroom management was defined as a "team." Hence, the first research question was:

> Does the existence of a team lead to a more Active classroom?

It was hypothesized that there are benefits from a team's being able to share the tasks of planning for an Active Classroom, and then managing it. Therefore a larger team, with its potential for broader division of labor, was expected to have a more Active classroom than a smaller team. The second research question, then, was:

> Does a larger team have a more Active classroom than a smaller team?

An enlargement of the team is quite often accompanied by an expansion of the range of ages of the children for whom the team is responsible. A small range of grades being taught by a team may facilitate finding appropriate activities for children.[1] However, with a very large team or a grouping of several grades, the organizational problems could become significant. The third research question was:

> As the team size and number of grades taught increases, is there a decrease in Activity?[2]

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[1] E.g., following the philosophy of the ungraded classroom (Goodlad & Anderson, 1963), the fast third grader can work with a group of fourth graders or tutor a second grader.

[2] The small group literature dealing with group size is not applicable, since the groups are not ongoing work groups, and this changes the interaction pattern (Molnar, 1971).

Very large teams were expected in open-space schools with very big "pods."[3] The "natural" size of a teaching team is the number of teachers within one pod, since these teachers must coordinate their activities to some degree, owing to their proximity and audibility. However, if the natural group were very large or the students very heterogeneous, sharing the planning and the responsibilities could become burdensome. For such situations a modification of the third research question was suggested:

> As the natural organization becomes too complex because of large group size or number of grades present, does the group break into smaller subgroups to achieve cooperation or teaming more easily?

While an attempt was made to measure "Teacher Cooperation," the indices used were necessarily limited (see Chapter VI). Cooperation comes from knowing each other and from having developed standard operating procedures, which limits an outsider's judgment. For adequate measurement one would need to observe formal team meetings as well as the informal interaction of team members, both of which were beyond the scope of this study. The measures used were responses to straightforward questions given to all teachers in the open-space team-teaching schools: Does the team divide the labor of preparing for the teaching task? Are different teachers responsible for parts of the same instructional unit? Do teachers know where all the children are during the day? How often does the team meet formally?[4]

In addition to expecting the school's organization to have a relationship to the Active Classroom, we also wanted to take into account the teacher's attitude toward an Active Classroom. It seemed only reasonable to expect that a teacher who was not interested in conducting an Active Classroom would not structure the classroom for that purpose. If this is true, the amount of Activity can be a function of attitude as well as of organizational variables. More generally, we expected to find a positive correlation between a favorable attitude toward the Active Classroom and the existence of such an environment. A positive

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[3] A "pod" is the enclosed classroom area in modern, open-space schools, usually containing between two and eight classes of standard size (20 to 30 children).

[4] See Appendix A for the Teacher Questionnaire.

correlation might also indicate that a teacher who experienced an Active Classroom came to believe in it, since task experience can alter attitudes (see Breer & Locke, 1965).

It was also expected that teachers who believed in informal methods of control would cooperate more because that would help them achieve the more Active classroom they desired; and, similarly, that teachers who were highly cooperative would find informal control methods more effective and so tend to develop a more informal attitude toward the classroom. (No hypotheses were made concerning the effects of the principal's attitude. Its relationship with the teachers' attitudes and the Active Classroom were to be investigated.)

Attitudes toward an Active Classroom were difficult to ascertain. An original questionnaire was developed to measure only a certain aspect: the degree to which the teacher believed in the use of formal control of children (see Appendix A). The questionnaire contained nine items combined into an index, which was defined to measure "Control Orientation." The poles of the index are henceforth described as "Formal" and "Informal" Control Orientation. The Control Orientation of principals was measured, as well as that of teachers; however, no predictions were made as to how it would relate to classroom Activity.

The Research Problem

This theorizing on the relationships between school organization and the Active Classroom can be summarized. A team is defined as a group of teachers working in the same classroom area who plan together and share responsibility for classroom management. It was expected that owing to this cooperation teams would be more likely to create an Active Classroom than would the isolated self-contained-classroom teacher. A medium-sized team (three or four teachers) was expected to have a more Active classroom than a small team (two teachers). A large team (say, eight teachers) was expected to experience major organizational problems--especially if it taught several grade levels--and to divide into several small teams. The failure to form smaller teams was expected to lead to a less Active classroom. We were interested in the opportunities a large

pod might provide for cooperation between teams, but no specific predictions were made.

It was expected that teachers with Formal Control Orientation would have less Active classrooms than those with Informal Control Orientation; this was expected both because the informally oriented teachers would desire more Active classrooms, and because teachers with Active classrooms would become more informally oriented.

Predictor variables. The predictor variables then are: the type of school (self-contained or open-space); teacher and principal Control Orientation; the number of teachers in the team; the number of teachers in the pod; the number of grade levels taught by the team; and the amount of teacher cooperation. The hypotheses can be diagrammed as shown in Figure 1.* (School type as a variable was given two arbitrary values: self-contained-classroom schools having a value of one; open-space schools having a value of two.)

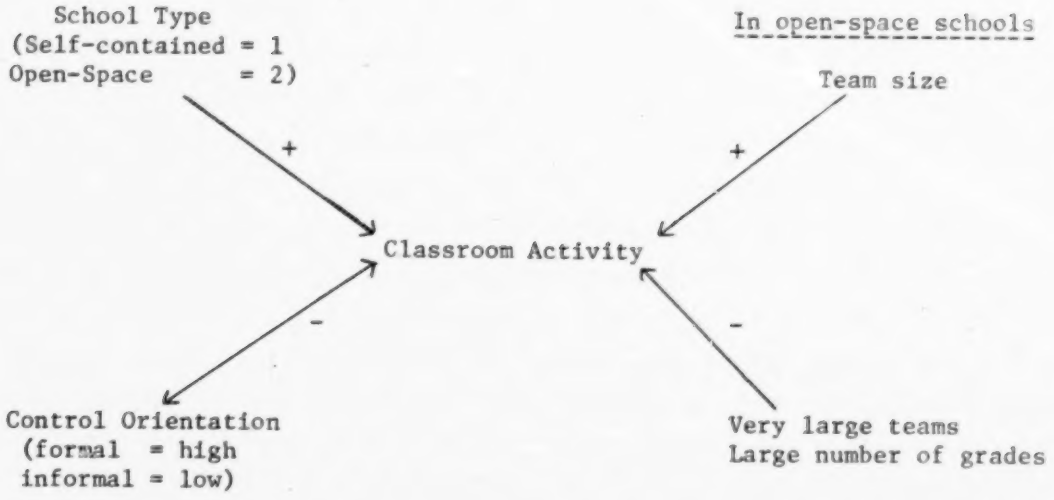
Dependent variables. There is no definitive way of identifying an Active Classroom. The measures chosen were aimed at finding out how the teacher structures the environment for the child (either encouraging or discouraging independent active behavior), as well as how actively and independently the child behaves in the environment. The chosen indicators of an Active Classroom were the amount of child movement and the types of learning groups and learning activities children engaged in.

A new instrument was designed to measure these. It had to be simple to use for collecting data from a large sample. A detailed explanation of the instrument can be found in Chapter IV. This report basically deals with the four major measures of an Active Classroom used in the research.

The Four Key Measures of the Active Classroom

The amount of movement not specifically directed by the teacher ("Movement") gave a positive measure of an Active Classroom. Several types of movement were distinguished, but those that were not directed by the teacher were of prime interest. Only clear physical movements were scored, such as a student walking, running, or crawling from one place to another. Just twitching in the chair or lifting an arm were not scored as movements. It was assumed that the teacher who allows

Hypothesized Relationships in All Schools



Hypothesized Relationships in Open-Space Schools

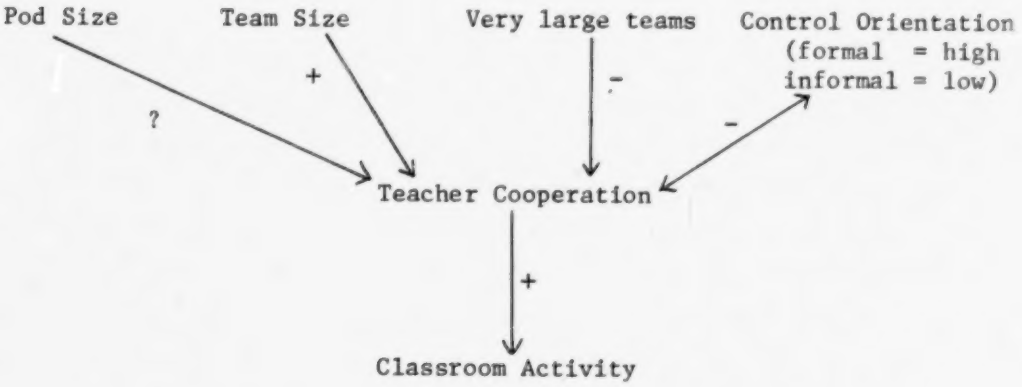


Fig. 1. Hypothesized relationships between structure of classroom and classroom Activity. (An arrow indicates a hypothesized relationship. Team size was expected to have a positive correlation with Activity except in the largest teams, or teams with a large number of grade levels.)

students to move around freely is giving them much more opportunity for independent and active behavior than one whose class is made to sit in chairs unless directed by the teacher to move.

The proportion of time children spent waiting, listening, and passive ("Passivity") gave a negative measure of an Active Classroom. This category comprised those experiences which involve least activity on the part of the child. (Listening was included here because it is impossible, when making quick observations, to know what is going on in a child's head.)

The proportion of time children spent in educational games, cooperative work, and doing when not in large groups ("Doing") gave a positive measure of an Active Classroom.[5] This category was used for situations where the child was doing something with his hands or body in a fairly structured way--especially at elementary school age an obvious indicator of opportunities for independent work and active behavior. The main concern was with Doing activities taking place in small groups and in isolation. Similar activities in large groups (e.g., all children cutting and pasting the same shapes) might indicate quite a high degree of activity, but not a high degree of independence from the teacher. Such activities in large groups were therefore excluded from the measure.

The proportion of time children spent in large groups ("Large Groups") gave a negative measure of an Active Classroom.[6] Research has shown that in many classrooms the individual student has very few chances to be either the instigator or the target of interaction (Adams & Biddle, 1970). In small groups and tutorial situations, these chances increase. Another kind of learning occurs when the student works alone and independently. The student has the least opportunity to learn for himself if he is part

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[5]There were three other categories for activities which were not used as major indicators in the final analysis: reading, writing, and discussing; free play and social talk; deviant. (See Chapter IV for details.)

[6]There were five other categories for learning groups which were not used as major indicators in the final analysis: alone; student with student interaction; small group without an adult present; small group with an adult present; tutorial of one student with one adult. (See Chapter IV for details.)

of a large group or works alone on an assignment common to the whole class (e.g., "problem 9 on page 43"). We therefore defined a Large Group to include both genuine large groups (of ten students and above) and situations in which ten or more students worked separately on the same problem.

The first three measures were taken independently of each other (the fourth measure, Large Group, is slightly dependent on Doing, since Large Group work is excluded from Doing). Consistent results would therefore strongly suggest that a basic general characteristic was being assessed.

CHAPTER III

THE SAMPLE

Distribution of Team Size Within Open-Space Schools

One unanticipated finding of this study came very early, during the selection and scheduling of teams. The Meyer et al. (1971) study reports that in a sample examined in 1969 most teams consisted of three or four members. In 1971, a sampling from the same population of schools revealed that the majority of teams had broken down into teams of two or three members. Although some of the teams involved the same people as in the earlier study, it was only by including in the sample every available team with more than two members (limiting the sample to three teams per school) that some spread of team size was achieved in the study. Even so, only two teams larger than four members could be included in the study--whereas Meyer et al. had reported 23 in their study (see Table 1).

The principals of the participating open-space schools were asked about the history of their team sizes. Some pods were built in such a way that the number of teachers in one pod could be two, three, or four; but in the majority of schools studied, the pods were built to hold the equivalent of six classrooms (see Table 2). In the sample of 11 open-space schools, six had experienced the formation of subgroups within the first two years of their existence. Only two built larger teams; two did not change, and one school was experiencing such rapid change that classification was impossible. Major reasons given for the formation of subgroups were that the teachers preferred to work in smaller groups; that cooperation was easier; that planning was less time consuming; that otherwise class sizes became too large; and that the building was not designed for large teams.

Interestingly enough, when asked what they would suggest as ideal pod size, number of grades per pod, number of teams per pod, team size, and number of grades per team, both principals and teachers, with few exceptions, suggested an arrangement feasible in their own particular

TABLE 1

Sizes of Teams Studied in Open-Space Schools
in Spring 1969 and Spring 1971

Team Size	Spring 1969 Meyer et al.		Spring 1971 Lueders-Salmon	
	No.	Percent	No.	Percent
2	9	10%	10	45%
3	27	30	8	36
4	32	35	2	9
5	5	6	--	--
6	3	3	1	5
7	7	8	--	--
8	2	2	1	5
9	6	7	--	--
Total	91	100%	22	100%

TABLE 2

Distribution of Sampled Teams By Size of Pod

Pod Size (No. of classes accommodated)	Number of Sampled Teams
2	2
3	2
4	3
6	12
7	2
8	1

building, and usually one existing at the time. Probing by the interviewer did not alter this response. Whatever their present situation, most of them wished to retain it; a few requested minor changes. Most suggestions for change were not related to structural changes, but were concerned with extra help in the form of a resource teacher, teacher aides, or smaller classloads.

Distribution of Grade Levels

Fortunately the spread of grade levels was fairly uniform, which permitted trichotomizing the sample in later analysis (see Table 3).

TABLE 3

Distribution of Grade Levels of Classes Observed

Grades	Self-Contained	Open-Space	Total
1, 2, and 2/3	3	8	11
3, 4, and 4/5	5	6	11
4/5/6, 5, 5/6, and 6	3	8	11

The two largest teams (of eight and six members) and one of the two four-member teams were in the highest grades (4/5/6, 5/6, and 5). This may be the result of a trend toward subject specialization, which is more prevalent in higher grade levels.

Description of the Sample

The open-space schools. The investigator spent approximately eight weeks at the beginning of 1971 visiting most of the open-space schools near Stanford University. Some of these schools had participated in previous studies done by the Environment for Teaching Program at the Stanford Center for Research and Development in Teaching, and most principals were rather pleased to be asked to participate again. Once the design of the study was completed, schools with individualized in-

struction programs were eliminated. The remaining principals were contacted again; all of them agreed to ask their teachers for cooperation.

Some principals just asked us to come in any day, choose any team, and go ahead with the study. In other schools, team participation was on a volunteer basis only. Our criteria for selection were the size of the team, the grade level of the children, and the possibility of scheduling observation times for science or social studies classes. Since there were few teams larger than two, every team with three or more members was automatically selected.

Although the observation dates scheduled for the school were confirmed two days in advance, the teams quite often had forgotten about the study by the time the observers arrived. This caused problems if a team had scheduled a film, since movement was to be observed. (No classes where films were shown were observed.) Observers were then rescheduled. The teachers were put at ease about the observations by being told that the objects of observation were the children; most of them soon seemed to forget about the presence of the observers. (Because of the novelty of open-space schools, they are accustomed to having visitors.)

All of the open-space schools were in middle-class neighborhoods. The self-contained-classroom schools were therefore selected from similar neighborhoods in the same school districts.

The self-contained-classroom schools. The selection procedure differed here. The assistant superintendent of the school district from which most of the open-space schools had been drawn was contacted and asked for cooperation. He then sent a letter to the principals of all self-contained-classroom schools in his district, approving the proposed research and asking for cooperation. This made it very easy to obtain cooperation by telephone.

Again, some schools had to be eliminated because of special ongoing projects. In the participating schools, principals talked to their teachers and reported on who would participate. Several of them gave a choice of grade levels, but some chose particular teachers they wished to be included. In the self-contained classrooms there may have been more of a "special day" effect than in the open-space classrooms. Ob-

servers were sometimes greeted with apprehension by the self-contained-classroom teachers. There may have been an effect of selection by the principals, since there were relatively more experienced self-contained-classroom teachers than open-space-classroom teachers in the sample, though they were not much older (see Table 4).

TABLE 4

Age and Teaching Experience of Participating Teachers in Self-Contained-Classroom Schools and Open-Space Schools

Age of Participating Teachers		
Age	Self-Contained-Classroom	Open-Space
20-25	2	14
26-30	2	18
31-39	5	17
40 +	2	17
Total	11	66

Years of Teaching Experience		
Years	Self-Contained	Open-Space
1 and 2	2	10
3-5	0	21
6-10	6	19
11 +	3	16
Total	11	66

The Control Orientation Index and the Distribution of Scores in the Two School Types

It was possible to structure the sample to obtain similar distributions of grade levels in the two school types, and to choose schools from similar social neighborhoods; but there was no way to guarantee similar distributions of teachers' ages, teaching experience, or scores on the Control Orientation index.

Control Orientation was measured by a specially designed questionnaire (see Exhibit 1). The intercorrelation of items in the questionnaire was very high (see Appendix B, Table 1). The index was formed by adding the scores on the nine questions, scoring each from 1 to 5. A high score on the index indicated formal Control Orientation, and a low score, informal. It should be noted that all the questions essentially concern the control and freedom of children; thus, only one aspect of teacher attitude is measured by the index, which may help explain how Control Orientation correlates only with some of the dependent variables, as discussed in Chapter V.

In open-space schools the mean score on the index was computed for the teachers in each team, and was used as a measure of the whole team's Control Orientation. Table 5 gives the distribution of scores on the index. The teachers in the traditional schools had a slightly more informal orientation than those in open-space schools, although not to a significant extent.

The principals in the open-space schools seemed to have a much more informal orientation than those in traditional schools, though this is not statistically significant. If the difference is not spurious, it is interesting to speculate on its cause: Are more informal principals selected for open-space schools? Do their responses reflect an organizational rule--"children in this school are allowed to move around"--rather than their own attitudes?

Within the open-space schools the principals were significantly more informally oriented than the teachers. Again this may be because of the role of the principal to think in terms of an ideology or "rule," whereas the teachers think in terms of an actual classroom situation.

Exhibit I

Attitude Questionnaire

The following questions are about children in general. Even though children do differ from each other, please answer these questions with the "typical" child in mind.

The answering categories are: SA= strongly agree; A= agree; U= undecided D= disagree; SD= strongly disagree.

	SA	A	U	D	SD
1. In general, school children should be allowed a lot of freedom as they carry out learning activities.					
2. A child should obtain the consent of the teacher before moving about in the classroom.					
3. Children are not mature enough to make their own decisions about their learning activities.					
4. Children get distracted when other activities are going on around them.					
5. Most children are capable of being resourceful when left on their own.					
6. Children are unlikely to learn enough if they are frequently moving about.					
7. Children should normally be encouraged to get information from each other instead of asking the teacher.					
8. Children can learn from small group discussion without the help of an adult.					
9. It is good for the child to have his activities scheduled for him.					

[Note: The questionnaire was administered to both teachers and principals. All statements were weighted equally and the five-point scores added. On positive items strongly agree was scored as 5 points, strongly disagree as 1 point. Nos. 2, 3, 4, 6, and 9 are negative items.]

TABLE 5

Distribution of Scores on Control Orientation Index for Teachers, Teams, and Principals in Participating Schools

Index Score		Teachers		Teams[a]	Principals	
		Self-Contained	Open-Space	Open-Space	Self-Contained	Open-Space
Informal	9-17	4 (36%)	11 (17%)	4 (18%)	1 (14%)	6 (55%)
	18-20	3 (27%)	19 (29%)	5 (23%)	2 (29%)	3 (27%)
	21-24	2 (18%)	18 (27%)	8 (36%)	2 (29%)	0
Formal	25-35	2 (18%)	18 (27%)	5 (23%)	2 (29%)	2 (18%)
N		11	66	22	7	11

Note: Principals in open-space schools are significantly more "informal" than the teachers in open-space schools at the .05 level (Mann Whitney U test, two-tailed).

The apparent difference between teachers in traditional and open-space schools is partly caused by two of the self-contained-classroom teachers scoring exactly 17. The difference is not statistically significant, nor is that between the two sets of principals.

[a]A team's score was the mean of the scores of its members. For assigning teams to categories, the cut-off points between groups were 17.5, 20.5, and 24.4.

CHAPTER IV

PROCEDURES FOR CLASSROOM OBSERVATION

Description of the Observation Sheet

The basic question of this study was whether structural differences among schools and teams and attitudinal differences among teachers and principals are associated with the Active Classroom. An observation sheet (Exhibit 2) was designed to capture the features of an Active Classroom. It was in two basic parts, the upper part for recording information on the types of learning group the children were in and the types of activity in which they were involved, and the lower part for scoring the physical movements of the children. (For the technique of scoring and timing, see the Observation Manual, Appendix A.)

It should be noted that this observation instrument was developed specifically for this research. The measures that have been used by other investigators of classroom interaction and behavior have often included verbal interactions. Sometimes video tapes have been made of the classroom (e.g., Adams & Biddle, 1970), usually to support verbal interaction studies or case studies. Some very sophisticated instruments have simultaneously noted verbal content and the groupings of children (e.g., the observation procedures developed at Stanford Research Institute by J. Stallings). The instrument developed for this study was designed to be simple to use with a large sample and to gather data on groupings of children, their activities, and their movement. Observations were made on all children within a self-contained classroom or an equivalent area of an open-space pod.

The categories for the learning groups were very simple: three to ten students in one group were defined as a Small Group; Small Groups were divided into those with adults present and those without. A one-to-one relationship was either a Tutorial (an adult and a student) or a Student-to-Student interaction. Large Group included all groups of more than ten members. The term covered not only lecture type situations but also numbers of students working alone and all doing the same thing, e.g., working on the same math problem or cutting and

Exhibit 2

Observation Sheet

School/Team/Teacher:_____ Observer ID:_____ # Children ____ ____ ____

Date:_____ Scheduled Activity:_____ Minutes Obs'd ____ ____ ____

	Alone	Std - Std	Sm Gp w/o Ad	Sm Gp & Ad	Tutorial	Large Group	Totals
Reading Writing Discussing							
Waiting Listening Passive							
Educ. Gme Coop Work "Doing" Report to group							
Free Play Social Talk							
Deviant							
Total							

MOVEMENTS x indicates outside section. Total # outside:

Directed	Task & Non-Directed	Non-Task	Deviant	Total

pasting the same shapes. The Alone category was for students who worked individually.

The activities of the children were divided into five categories. Reading, Writing, and Discussing, traditional experiences, demanded some action from the child. If the child was the recipient of an answer in a discussion situation, his activity was scored as Discussing. Waiting, Listening, and Passive comprised the child's least active experiences. Listening was included here because it is impossible, in making quick observations, to know what is going on in a child's head. Two categories were used for situations in which the child was doing something with his hands or body. More structured experiences were categorized as Educational Games, Cooperative Work, and Doing; a child reporting to a group of his peers was put in this category. Less structured experiences were scored as Free Play and Social Talk. The final category of Deviant comprised only situations in which it was clear to the observer that the teacher considered the student's behavior to be deviant, e.g., if the child was reprimanded or was obviously trying to stay in hiding from the teacher.

As a result of ample experience in using the observation sheet, it is clear that the Free Play and Social Talk category was the most ambiguous to score. It included some activities which the teacher probably would have disapproved of had he seen them, but scoring such actions as deviant would have indicated subjective observer judgment, which was undesirable for this study. The category also included activities that could have been defined as Doing, such as petting a guinea pig.

Movements were scored in four categories: Teacher-Directed, Non-Teacher-Directed (Task), Non-Task, and Deviant movements. Teacher-Directed movements were only those which the observer heard to be such or could easily infer to be such (e.g., the child leaving the teacher after conferring with him). The distinction between Non-Teacher-Directed (Task) and Non-Task movements was based on the degree of playfulness exhibited and the social context of the movement (e.g., children playing hide and seek or getting together for a social chat were scored as making

Non-Task movements). There was an occasional ambiguity when a playful Doing movement bore a resemblance to an academic task (e.g., the unassigned picking up of a magnifying glass with the ensuing dashing about the classroom looking at things). The tendency was to score such movements as Non-Task. Again, movements were scored as Deviant only if the children were obviously in hiding from or were reprimanded by the teacher.

The Selection and Training of Observers

The observers had to be mature and reliable since they had to talk to teachers, put them at ease, administer the questionnaire, and make judgments on the spot if problems occurred. Not only were the observers highly satisfactory in these respects, but also all of them had had the benefit of some teaching experience themselves. Most of the observations were collected by the major investigator and one other observer. Two additional observers were trained and used part of the time.

The observers were trained in one open-space pod. The teachers and students of this pod were accustomed to observers and did not mind repeated observations. As soon as consistent reliability between observers was achieved, the fieldwork began. Reliability checks were made at least every second observation day. Since observations were usually made each working day of the week, this meant three checks per week. In this way no serious idiosyncracies developed between reliability checks. The observations were made concurrently in open-space and traditional schools, so as to avoid possible systematic bias.

Reliability

The Observation Sheet contains 16 subtotals: six learning groups, five classes of activity, four kinds of movement, and total movement. The reliability standard required at least 14 of these 16 subtotals to match for the two observers; a match meant the totals could not differ by more than 10 per cent (or by 2, if the totals were less than 20).

Of the 51 reliability checks taken, 46 met this criterion. Of the five that were unsatisfactory, one was taken after an exhausting morning just before recess; four checks were taken after recess and all were

satisfactory. Two unsatisfactory checks indicated a conceptual difference in categorizing activities; this was discussed and further checks were satisfactory. Two unsatisfactory checks were taken just before recess when the distinction between types of movement was hard to make.

CHAPTER V

REVIEW OF FINDINGS

The major analysis of findings was done with the four key indicators of classroom activity briefly described in Chapter II: Waiting, Listening, and Passive behavior (Passivity); Non-Teacher-Directed movement (Movement); Educational Games, Cooperative Work, and Doing, not in Large Groups(Doing); and Large Group work (Large Group). The first is a measure of a condition in which children are not behaving actively and the second is a measure of the extent of their (independent) activity. The third reflects the opportunities the child is given to learn through initiation and interaction, and the fourth defines a situation in which initiation and interaction are least likely to occur.[1]

The first three measures were taken independently of each other; the fourth is only slightly dependent on the first and third. All four measures gave consistent results, greatly reinforcing the significance that can be attached to the findings.

The rest of this chapter discusses these measures of the Active Classroom. In all cases a full tabulation of the data, including the other categories on the observation sheet, is given in Appendix C.

Formal Statement of Predictions and Findings

First Prediction: Open-space classrooms would be more Active than self-contained classrooms.

This was found to be true on the four measures of the Active Classroom: in particular, the open-space classrooms showed almost twice the level of Movement of the self-contained classrooms.

Second Prediction: Teachers with informal Control Orientation would have more Active classrooms than those more formally oriented.

This was found to be true for the measures of Movement and Passivity; a less strong relationship appeared between teacher Control Orientation and the use of Large Group and Doing activities by teachers.

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[1] The intercorrelations of these four variables are given in Appendix B, Table 4.

Third Prediction: Medium-sized teams would have more Active classrooms than small teams.

Three- and four-member teams had more Active classrooms than two-member teams as measured by the use of Large Group and Doing activities. Size of team was less strongly related to Movement and Passivity.

Fourth Prediction: Very large teams would either divide themselves into several smaller teams or would have less Active classrooms than medium-sized teams. This effect would be particularly strong if the large team taught several grades.

It was found that in a large population of open-space team-teaching schools most of the teams that started with six members or more had divided into smaller teams. It proved impossible to sample enough large teams to test whether they did have less Active classrooms.

Fifth Prediction: Small and medium-sized teams teaching two grade levels would have more Active classrooms than those those teaching just one grade level.

This was not found to be the case. It was found that teams with two, three, or four members teaching two grade levels had less Active classrooms than teams teaching just one grade level. This may have been caused by a general lack of planning for the ungraded situation or by the teachers finding the organizational tasks too difficult.

The remaining predictions concerned the level of teacher cooperation in the open-space schools. The measures of teacher cooperation used proved inadequate to test these hypotheses. The one measure that was usable, however--teachers' report of Hours Spent in Cooperative Teaching--correlated highly with teacher Control Orientation, as predicted. The more informally oriented teachers reported more time spent in cooperative teaching than their more formally oriented colleagues.

Differences Between Self-Contained-Classroom Schools and Open-Space Schools

The main emphasis of this study was to determine whether organizational differences in elementary schools were associated with differences in the school environment as experienced by the child: the presence or

absence of an Active Classroom. Since only teams were observed in open-space schools, and only single teachers in self-contained classrooms, it was impossible to separate the effects of teaming from those of school architecture. That open-space schools and team teaching, in combination, led to more Active classrooms was, however, undeniable. It will be noted that the four indicators of an Active Classroom consistently gave the same results. This strongly suggests that the findings are not the result of the peculiarities of a single measure, and that a basic general characteristic of the classroom was being measured.

As mentioned before, observations were taken in three different subjects: reading, mathematics, and social studies (or science). Even though there were differences between the three subjects, they were differences of degree only, and not of substance. All the differences between the two types of school were in the same direction for the three subjects--except in very minor instances--with the open-space schools being the more Active. The differences were most marked in social studies and science; the least difference occurred in mathematics. A plausible interpretation is that social studies had the least confining curriculum, enabling the teacher to make fullest use of the opportunities inherent in an open-space team-teaching situation; in contrast, mathematics had the most structured curriculum. More specifically, social studies/science had the most Waiting, Listening, and Passive behavior, the least Reading, Writing, and Discussing, and (by a factor of two) the most Educational Games, Cooperative Work, Doing, not in Large Groups. It had easily the least emphasis (by a factor of almost two) on children working Alone; their time was spent mainly in Large Groups and quite a lot in Small Groups without Adults.

There was almost no difference between reading and mathematics in the type of group used, although there were more children working Alone in reading and in Small Groups with an Adult, whereas mathematics utilized more Large Groups (it may be remembered that if all children were doing the same exercise, they were regarded as working in a Large Group). The observers gained the impression that a major part of the Large Group work in mathematics involved children working individually on a common

exercise, while in social studies the Large Group work meant the traditional pattern of children listening to the teacher. This was supported by the much lower Waiting, Listening, and Passive figure for mathematics and the higher figure for Reading, Writing, and Discussing.

There were virtually no differences between the subjects with regard to the amount of movement; there was marginally more movement in mathematics than in the other two subjects. (See Appendix C, Table 3.)

In order to make the figures more comprehensible, the three subjects have been combined with each subject given the same weight. For each team (or self-contained-classroom teacher) in the sample, the proportion of time children spent Passive, Doing, and in Large Group was computed, as was the number of movements per minute which were not directed by the teacher. Within each school type these figures were then averaged over the classrooms observed, to give a mean proportion of time spent in this way or (for Movement) a mean number of movements (see Table 6). Thus the 60.5 figure appearing in the lower-left cell of Table 6 indicates that averaging over observations in the three subjects 60.5% of the children's time in the 11 self-contained classrooms was spent in Large Group.

TABLE 6

Mean Number of Movements per Child per Minute and Mean Percentage of Children's Time Spent Passive, Doing, and in Large Group: Analyzed by Self-Contained and Open-Space Classrooms

	Self-Contained-Classroom Schools	Open-Space Schools
Non-Teacher-Directed Movement Movement	0.091**	0.176
Waiting, Listening, Passive Passivity	34.7*	24.3
Educational Games, Cooperative Work, Doing, not in Large Group Doing	4.7*	9.4
Large Group Large Group	60.5*	43.3
N (Classrooms)	11	22

*Difference significant at .05 or less
**Difference significant at .01 or less
(One-tailed t-test; 31 degrees of freedom.)

The first row of Table 6 concerns the number of movements made by the children that were not directed by the teacher. A high frequency of Movement was defined to indicate an Active Classroom. The difference between the two types of school is dramatic. In order to communicate more fully what is meant by a figure of 0.091 movements per child per minute, let us consider a ten-minute span in a classroom of 25 children: in such a self-contained classroom there are 23 Movements (25 x 10 x 0.091); in an open-space team-teaching school the corresponding number is 44.

The second and third rows of Table 1 concern the frequency with which children were engaged in various activities. A high incidence of Passive behavior (Waiting, Listening, and Passive) was taken to indicate an Inactive Classroom. A high incidence of Doing (Educational Games, Cooperative Work, Doing, not in Large Group) was taken to indicate an Active Classroom, since it is in such situations that a child has the greatest opportunities to learn for himself and to initiate activity. Table 6 shows that on both of these measures the open-space team-teaching schools were significantly more Active than the self-contained classrooms, children in open-space team-teaching schools were found twice as often involved in Doing.

The last row of Table 6 concerns the frequency with which children were observed in Large Group. A high frequency of Large Group was taken as an indicator of an Inactive Classroom: an Active Classroom was expected to give children many opportunities for independence and interaction with others, which is relatively rare in Large Groups. Again, there was significantly less Large Group instruction observed in the open-space team-teaching schools than in self-contained classrooms.

Thus the four key measures of the Active Classroom all showed that the open-space team-teaching schools were significantly more Active than comparable self-contained classrooms. Given that three independent forms of indicator were used, this is strong evidence that something "general" was measured, and that the indicators are meaningful. The consistency of the relationships gives construct validity to the concept of an Active Classroom.

Differences in Activity Related to Teacher Control Orientation

It was noted in Chapter III that there is no relationship between type of school and Control Orientation. In order to see if Control Orientation was related to the classroom observations, the Control Orientation index was trichotomized: the most Formal group and the most Informal group each contained approximately one-quarter of the teachers; the remaining half of the teachers formed the middle group. The various activities, groupings, and movements were then averaged over the classrooms of the teachers within each group. In the open-space schools the averaging was over teams; each team's Control Orientation was defined as the average of the scores of its constituent teachers. In addition to this cross-analysis, the Pearson correlation was computed between Control Orientation and each of the dependent variables. (A positive correlation means that more Formal Control Orientation in teachers is associated with the activity concerned.)

The questionnaire asked specifically about the willingness of the teacher to permit children to move independently and frequently. It was therefore expected that teachers with Informal Control Orientation would have more Non-Teacher-Directed movement in their classrooms. As shown in Table 7 the most informally oriented teachers had half again as much Movement as the most formally oriented. More detailed analysis of the data showed that there is no significant relationship between Control Orientation and Teacher-Directed Movement ($r = -.06$). (See Table 4 in Appendix C.) The lack of relationship with Directed movement suggests that the attitude dimension being measured by the questionnaire was specifically related to independent behavior of children, and not just to movement, per se.

The informally oriented teachers were also expected to have a greater proportion of children without direct adult supervision. The finding that these teachers had their children spend significantly less time Waiting, Listening, and Passive ($r = 0.38$),[2] and had them involved in

[2]The Kendall correlation is only .16 (not significant at the .05 level). Analysis of the raw data indicated that a few extreme cases on one end of the attitude scale seem to cause the much higher Pearson

TABLE 7

Mean Number of Movements per Child per Minute and Mean Percentage of Children's Time Spent Passive, Doing, and in Large Group: Analyzed by Teacher Control Orientation with Pearson Correlation

	Teacher Control Orientation			Pearson Correlation
	Formal	Middle	Informal	
Non-Teacher-Directed Movement Movement	.114	.145	.184	-.41**
Waiting, Listening, Passive Passivity	32.6	25.8	27.2	.38*
Educational Games, Cooperative Work, Doing, not in Large Group Doing	7.2	6.3	11.8	-.29*
Large Group Large Group	59.2	51.4	34.0	.38*
N (Classrooms)	8	17	8	33

Note: In the computation of Pearson correlations, Formal Control Orientation was defined to be high.

*Significant at .05 or less.

**Significant at .01 or less.

correlation, which may have seemed astonishing to the reader after looking at the cross tabulations. The figures were double checked, however, and are correct. After looking at the raw distribution of Waiting, Listening, and Passive behavior and Control Orientation, we are confident that at least a very formal orientation of the teacher does influence what goes on in the classroom.

significantly more Educational Games, Cooperative Work, Doing, not in Large Group (r = -0.29) supports this expectation. There was also significantly less Large Group work with the informally oriented teachers (r = .38).

Although no relationship was shown between type of school and Control Orientation, it is clear from this discussion that informal Control Orientation is strongly associated with an Active Classroom on all four measures used. The four measures gave consistent findings of the existence of an Active Classroom.

Intercorrelations of the Predictor Variables

The predictor variables were all correlated with one another (see Appendix B, Table 3). Many of the intercorrelations merely reflect obvious connections--between the size of the team and the number of grades taught by the team, for instance. Of the material correlations, the more informal teachers spent more time in cooperative teaching, as was originally predicted; cross-grade grouping appeared to be more frequent the higher the grade level in open-space schools (only single-grade classes were selected from the conventional schools); and the more formal teachers seemed to teach the higher grades in open-space classrooms (tau = 0.25, not significant), but not in self-contained classrooms (tau = -0.03).[3]

Because of this intercorrelation, it is possible that the effects of one variable can show up as the effects of another, or cancel out the effects of a third. Further data analysis was therefore conducted using partial correlations, controlling for the effects of other predictor variables (the sample was too small to be divided).

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[3]Kendall Correlations are given here because Grade Level is not normally distributed and therefore does not meet the requirements for Pearson Correlations (shown in Appendix B, Table 3). However, Pearson Correlations are quoted in Appendix B between the predictor variables, since these were used to generate the partial correlation coefficients used in the analysis. There are possible technical problems in this approach. In particular, it is not true that most of the variables are normally distributed. In some cases variables are not even on an interval scale--grade level, for example. The alternatives seem worse, however, so this approach has been used. In particular, not controlling for variables leads to severe bias, and the non-parametric controlled tau does not have known significance levels associated with it.

The first such analysis of the data given below considers all classrooms and those predictor variables that applied to the whole sample: school type, Control Orientation, and grade level. The second analysis is confined to open-space team-teaching schools.[4] Here, teacher and

TABLE 8

Independent Correlations of School Type, Teacher and Principal Control Orientation and Grade Level with Measures of the Active Classroom (N = 33)

Variable	Movement	Passive	Doing	Large Group
School Type[a]	.57**	-.47**	.32*	-.33*
Teacher Formal Control Orientation	-.48*	.42*	-.30	.38*
Principal Formal Control Orientation	-.05	-.00	-.08	.25
Grade Level[b]	-.11	.18	-.10	.21

Note: These are Pearson partial correlations holding the other three predictor variables constant.

[a]Self-contained classrooms have value 1, open-space classrooms have value 2.

[b]In mixed-grade classes "grade level" is the average grade present.

*Significant at .05 or less
**Significant at .01 or less

[4]For this analysis a sample of only 20 teams is used, and the partial correlations control for five variables, leaving just 13 degrees of freedom. (Note 5, page 39, explains why the sample does not include the two largest teams.) In such an analysis it is possible for the intercorrelations reported to be highly sensitive to the variables included, and to change dramatically as just one and then another control variable is introduced. The significant correlations reported on these data (Table 9) are not as sensitive and are of consistent direction as new control variables are added. It is therefore considered that the correlations are meaningful and reflect underlying relationships among the variables studied.

principal Control Orientation were included as control variables; the main predictor variables were the number of different grades taught by the team, the average grade level taught, the Number of Hours Teachers Reported as Spending in Cooperative Teaching, and team size (dichotomized: teams of two members versus teams of three and four members).

School Type and Teaming

Table 8 again shows clearly that school type was a major determinant of Activity, with particularly high correlations with the Movement variable. There are many possible reasons for this difference between the two school types. It was originally hypothesized that teaming would enable teachers to share the planning of their lessons, which would help them provide a more Active environment. Apparently, open-space structure in combination with team teaching encourages the children to move more, and the teachers to let them move more. Moreover, movement may be less disturbing to the teacher as the larger space allows it to be more often outside his line of vision. Similarly the extra and usually free center space may make it physically easier for the children to move around without disturbing others, particularly since the seats within the individual sections are usually kept close together.

However, just as there are no real boundaries for a class of students or an individual teacher, and people constantly step physically over their section boundaries, so some noise from their activities carries over. This constant background noise seems to make the teacher less aware of noise from his own section. The carpeting that was common to all the open-space schools studied reduced the noise caused by movement considerably--pushing a chair to get up or sit down was not accompanied by distracting noise--thus making both noise and movement less obtrusive. Carpeting also made the floor into a functional play and sitting area. When visiting self-contained classrooms (all of them without carpeting) the observers were struck by the dramatic increase in noise caused by movement of any kind. The noise factor may well contribute to the much lower average level of movement in self-contained schools. If movement is less distracting to the teacher, it is understandable that

he does not often require children to stay in their seats. This change in teacher behavior can help to explain the marked decrease in Passive behavior in open-space schools. It seems much easier for a child just to get up and occupy himself with something in the open-space classroom than it is in a conventional self-contained classroom.

There also seemed to be an "organizational rule," in open-space team-teaching schools, that movement is acceptable: presumably this is in part a consequence of the existence of greater movement, but such a norm can clearly also reinforce tendencies to greater movement. Principals of open-space schools seem to be proud when they can point to students moving about while showing a visitor around. Students seem to be quite aware of this: there is usually no hiding from the principal, but rather a friendly "hello" when student and principal meet in the hallway.

Teacher and Principal Control Orientation

Table 8 shows that after controlling for school type, teacher Control Orientation had the strongest relationship to the Activity measures. It was most clearly related to Movement and its opposite, Passive behavior. It was also related to Large Group and Doing, but the correlations are lower. This suggests that responses to the questionnaire related principally to the teacher's beliefs about keeping control over children and not so much to the teaching techniques used.

A two-way relationship between teacher Control Orientation and classroom Activity was originally hypothesized. It was argued that more informally oriented teachers would encourage movement; it was also expected that where a teacher experienced more movement in his classroom he would become more informally oriented. It seems very unlikely that this reverse relationship occurred in the sample. In open-space team-teaching schools there was more Movement than in self-contained classrooms; therefore, if movement affected Control Orientation one would expect the teachers in the open-space classrooms to have been more informally oriented than those in self-contained classrooms.

In fact, the relationship was slightly the reverse of this. The data therefore suggest that there is no significant effect of classroom movement on teacher Control Orientation and that informal Control Orientation leads to greater movement in the classroom.

The limitation of the questionnaire in assessing the teacher's belief about classroom control rather than his preference for different teaching techniques becomes even more clear in Table 9. Teacher Control Orientation within the open-space team-teaching schools was related only to the measures of Movement and Passivity and not to either Large Group or Doing. It is, however, of interest that the principal's Control Orientation seems to have been related to these two latter variables and not to Movement or Passivity, though none of the correlations was statistically significant. It is possible that teachers responded to the Control Orientation questionnaire in the context of what happened in the real life situation in their classrooms, and that the principals responded according to how they thought classrooms in their schools ought to be managed. A teacher has to be concerned with the effect of teaching activities and the effect of loose and strict control over children on the atmosphere and manageability of the classroom, while the principal can afford to be more concerned with the type of teaching and learning that ought to take place. A principal who sets rules associated with Activity might find it much more difficult to reprimand teachers for having passive or day-dreaming children than to give positive feedback to teachers who encourage Doing through the use of games, resource centers, etc. It is virtually impossible for a principal to rule that teachers must encourage movement by children, but relatively easy to state that there should be no large group instruction in the school when not absolutely necessary. Thus it is not unreasonable that principal Control Orientation is more related to Doing and Large Group than to Movement and Passivity.

Number of Grade Levels Taught by Team

Of the 20 teams analyzed in Table 9, 14 taught just one grade level and six taught two. It was originally hypothesized that the ungraded

classrooms would be more Active; however, Table 9 shows an opposite relationship--a strong negative correlation between two grade levels per team and classroom Activity on all four measures. This result suggests that there were organizational problems in handling two grades

TABLE 9

Independent Correlations of Teacher and Principal Control Orientation, Grade Level, Team Size, Number of Grade Levels Taught by the Team, and Teacher Report of Hours Spent in Cooperative Teaching with Measures of the Active Classroom, in Open-Space Classrooms
(N = 20 teams of 2, 3, and 4 members)

Variables	Movement	Passive	Doing	Large Group
Teacher Formal Control Orientation	-.46*	.41	-.00	.06
Principal Formal Control Orientation	-.10	-.08	-.22	.37
Grade Level[a,b]	.47	-.34	.32	-.15
Team Size[c]	.25	-.35	.50*	-.52*
Number of Grade Levels Taught by Team[b,d]	-.50	.65**	-.57*	.54*
Teacher Report of Hours Spent in Cooperative Teaching	.33	-.13	.37	-.41

Note: Pearson partial correlations holding the other five predictor variables constant.

[a]In mixed-grade classes, grade level is the average grade present.

[b]Correlations were not hypothesized; two-tailed significance given.

[c]Teams of three and four members are combined and compared with teams of two members (see footnote 12).

[d]All teams in this sample taught either one or two grade levels.

*Significant at .05 or less
**Significant at .01 or less

per team. Most of the teams in the sample that handled two grade levels seemed to do so not because they wanted an ungraded situation per se, but because low enrollment made it impossible to team except by combining grade levels. In consequence, it seemed there may have been no real commitment to the idea of an ungraded classroom and no special planning to take advantage of its possible benefits or to minimize its disadvantages (Goodlad & Anderson, 1963).

Team Size and Teacher Cooperation

Fifteen teams worked in pods containing six or more teachers; in only two cases did the teachers in the pod form a single team. In most cases the teachers in the pod had originally formed one team, and had later divided into subteams. This confirmed the hypothesis that organizational problems in large teams would lead to such a division. It was also predicted that large teams that did not break down into smaller teams would not cooperate effectively and would have less Active classrooms. Unfortunately, not enough large teams were available to test this hypothesis.[5]

It was predicted that, compared to two-member teams, teams of three and four members would be able to share the task of planning and managing the classroom to a greater extent, resulting in greater cooperation and a more Active classroom. It was found, as predicted, that the three- and four-member teams did have more Active classrooms than two-member teams, especially on the measures of Large Group and Doing. The lower negative correlation with Passive behavior is also consistent with the hypothesis--the direct effect of planning is likely to be on

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[5] We were able to include only two large teams in our sample. To avoid biasing results by including these two teams in correlations with team size (where they would have received particularly heavy weighting) correlations were calculated on the sample of open-space team-teaching schools excluding these two teams. Eliminating them left ten two-member, eight three-member and two four-member teams. Again to avoid possible bias, the three- and four-member teams were grouped together, thus dichotomizing the variable team size in Table 9.

the type of groupings and the multitude of activities used; less passive behavior is likely to be an indirect effect. The lowest correlation is with Movement, which does not fully support the original prediction that more teachers could supervise proportionately more movement. The obvious interpretation is that increased ability to plan lessons by virtue of being with colleagues leads to a greater number of activities and fewer of the Large Group exercises that a solitary teacher or a two-member team may use with less aggregate time for preparation available. (The greatest effect of all is in Large Group instruction.)

The measures of teacher cooperation used proved to be inadequate, and all predictions involving teacher cooperation remain untested. Teacher Report of Hours Spent in Cooperative Teaching was, however, included in the partial correlations as a control variable. As predicted it correlates positively with the Active classroom; but the correlations are not statistically significant. It is impossible to say whether the relatively low correlations reflect an overstatement of the original hypothesis or merely reflect an inadequacy of this measure of cooperation among teachers.

Grade Level

The partial correlations in open-space team-teaching schools (Table 9) show the higher grade levels as more Active. This relationship does not show in Table 10 because the teachers in open-space schools in our sample were more formal on Control Orientation in the upper grade levels. It is only when Control Orientation is controlled for that the underlying relationship is measurable. In contrast Table 10 shows that in self-contained classrooms the reverse was true (further correlations between grade level and the dependent variables are given in Appendix B, Table 5); the higher grade levels were less Active, particularly as regards Movement and Passive behavior.[6] Even though these results were

[6] If the Activity measures in self-contained classrooms were calculated after controlling for teacher Control Orientation (as is effected by the use of partial correlations in open-space team-teaching schools), the difference would be even sharper, because teachers in the higher grade levels in our sample of self-contained classrooms were more informal on Control Orientation as compared to those in lower grade levels.

TABLE 10

Kendall Correlations between Grade Level and Measures of the Active Classroom, in Self-Contained-Classroom Schools and Open-Space Schools

	Movement	Passive	Doing	Large Group
Self-contained Classrooms (N = 11)	-.52*	.29	-.52*	.29
Open-space Schools (N = 22)	-.03	.01	-.09	.04

Note: In mixed-grade classes "grade level" is the average grade present.

*Significant at .05 or less

obtained with the use of partial correlations for the analysis of open-space team-teaching schools and on a small sample, it is possible that there was a genuine difference between the school types with regard to the effects of increasing grade level on Activity. This might have been caused by differing emphasis on curriculum. It is plausible that while an upper grade level teacher in a self-contained classroom finds himself regimented by the curriculum, the members of a team can give each other support in resisting curriculum pressures. This would be supported by the findings of Meyer et al. that teachers in self-contained classrooms were more curriculum oriented than those in open-space team-teaching schools.

Summary

All the predictor variables considered in the study are related to one another; it is therefore possible for the effects of one variable to show up as the effects of another, or to cancel out the effects of a third. To counteract this possibility, the data were analyzed using partial correlations, controlling for the effects of other predictor variables.

Open-space architecture in combination with team teaching was strongly related to all four key measures of the Active Classroom--even after controlling for teacher Control Orientation and the grade level of students being taught. Several factors are thought to have contributed to this relationship. The existence of teams of teachers in all the open-space classrooms studied may have made the division of the tasks of planning activities and managing the classroom easier, and thus led to a more Active environment. The extra space and visibility may have encouraged students to move more and teachers to have allowed more movement. The carpeted floors absorbed noises and may have encouraged movement by making it less obtrusive.

There was no substantial difference between the Control Orientation of the teachers of the two types of school. Informal teacher Control Orientation was clearly related to greater movement and less clearly related to the groupings of children used by teachers. It seems that the Control Orientation was directly related to the incidence of movement or passivity of children in the classroom.

Within open-space schools the teams containing three and four members had more Active classrooms than teams with just two members, particularly as measured by the groupings of children used. It is suggested that the larger teams could collectively plan more activities for the children than isolated teachers or teams of two members. Moreover, the larger teams were likely to have a greater range of materials readily available, further increasing the possibilities of Doing.

Teams in the sample teaching two grade levels had much less Active classrooms than similar teams teaching one grade; the difficulty of handling two levels seems to have counteracted other positive teaming

effects. However, little planning was apparently done specifically for the ungraded situation, which was sometimes no more than a side effect of the teaming of two teachers who were in charge of different grade levels.

In the open-space schools there seemed to be more autonomous child movement and less passive behavior in the upper grades than in the lower, when teacher Control Orientation was held constant. This finding is particularly striking since in self-contained classrooms the upper grades were the less Active, presumably because of emphasis on curriculum. The open-space environment seems to counteract such effects.

CHAPTER VI

TEACHER COOPERATION

In previous chapters the analysis of the data focused mainly on organizational variables (school type, number of grades per team, team size) with limited measures of ideology (teacher and principal Control Orientation). There is no way of extracting from these data the isolated effects of teaming on the Active Classroom. The characteristics shared by all the teams is cooperation in teaching tasks. What types and degrees of cooperation tend to develop? Comprehensive measures would include the time teachers meet formally and how they interact;[1] the time they formally teach together; the type and degree of formalization; the feelings team members have toward each other; the subjective impressions obtained from seeing team members during coffee breaks and quick discussions in the classroom (for observations of this sort it is especially important that the observer not be regarded as a stranger); the ease with which children switch from one teacher to another; and the subjects of teachers' discussions. In a study of this scope it was not possible to include such adequate measures. Instead all teachers in open-space schools were asked seven short factual questions (see Exhibit 3).

It was assumed that a child is allowed more choices and given more options if he has contact with more than one teacher. The relation between team size and the number of teachers a student is scheduled to see was examined (Question #1, Exhibit 3). (One cannot simply assume that every student sees every teacher who is on the team, since student-teacher contacts really depend on the manner in which teams divide the teaching load; a student may even see teachers not in his team, if there is cooperation among subteams within a pod. Cooperation among teams can lead to an exchange of students or to an exchange of teachers for certain

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[1] Molnar's (1971) study includes a comprehensive series of observations on this subject.

Exhibit 3

Questions Asked Teachers in Open-Space Schools
Regarding Cooperation in Their Pod

1. During a typical week, how many teachers is the average student scheduled to see? _____

2. How many students are placed in other teams for at least one subject? _____

3. How many hours does the team spend in cooperative teaching per week? _____ (Cooperative teaching means planning together for a unit or session, then collectively teaching the unit or session by combining the students or supervising them in co-operatively planned small groups.)

4. Are different teachers in your team responsible for the preparation of different instructional units (e.g., social studies or science) or for the preparation of different parts of the same instructional unit, or both?

   Never _____ Sometimes _____ Frequently _____ Always _____

5. Do you usually know what the childern in your team-mates' sections are doing?

   No _____ I have some idea _____ Yes _____

6. During the day, do you know which teacher each child in your pod is assigned to?

   Never ____ Seldom ____ Sometimes ____ Most of the time ____

   Always ____

7. How many times each month does your team meet formally? _____
   How long is each meeting (on the average)? _____

subjects.) Table 11 shows the relationship between team size and the number of teachers a student was scheduled to see. Only two of the two-member teams reported any scheduled contact of their children with other teachers; in teams of three, four, six, and eight members, in contrast, the average number of teachers a child was scheduled to see was approximately four. The children in the two largest teams (six and eight members) were scheduled to see only four teachers; this supports the prediction that large teams will break down into subteams.

TABLE 11

Teacher Report of the Number of Teachers a Child is Scheduled to See, Analyzed by Team Size

Team Size	Number of Teachers a Child is Scheduled to See					N (Teams)
	2	3	4	5	6	
2	8	1	1			10
3		3	1	3	1	8
4		1	1			2
6			1			1
8			1			1

Teachers were asked how much time the teams spent in scheduled meetings each month. Of the 12 teams which spent fewer than five hours in meetings, only two had their children scheduled with teachers other than themselves; five of the ten teams that met five or more hours per month scheduled their children with other teachers. This may be because coordination with teachers outside the team is complicated and therefore requires more meeting time.

Another question asked how many students were scheduled into other teams. The answers gave information about teams sending only a few

students to other teams, so this question was not simply a duplication of the first question. Tables 12 and 13 show the relationship of this measure to team size and pod size. Three-member teams sent the largest proportion of students to other teams; two member teams sent the second largest. Pod size also seems to be important: teachers in larger pods sent more students to other teams than did teachers in smaller pods, as might be expected if teams within a pod cooperate.

TABLE 12

Proportion of Students Reported to be Scheduled into Other Teams, Analyzed by Team Size

Number of Teachers per Team	Per Cent of Students Scheduled into Other Teams			N (Teams)
	0	up to 33%	over 33%	
2	3	6	1	10
3	2	2	4	8
4	1	1		2
6	1			1
8	1			1

The spread of answers to Questions #5 and #6 was poor. Most team members said they knew what teammates were doing, and they knew "Most of the Time" or "Always" where each child in the pod was during the day--which suggests that teachers were giving what they thought were correct answers. An added complication is that team members did not necessarily agree on these questions, some being more informed than others. (When there was disagreement the median answer of the team member was used.) It might be possible to study discrepancies in answers between different team members in future studies of the quality of cooperation.

TABLE 13

Proportion of Students Reported to be Scheduled into Other Teams, Analyzed by Size of Pod

Pod Size (Number of Teachers per Pod)	Per Cent of Students Scheduled into Other Teams			N (Teams)
	0	up to 33%	above 33%	
2, 3, 4	3	3	1	7
6, 7, 8	6	5	4	15

The final measure of cooperation, Hours Per Week Spent in Cooperative Teaching (see Table 14), has been used in previous chapters. Of the other measures discussed here, it correlates only with the time

TABLE 14

Distribution of Teams According to the Number of Hours Spent in Cooperative Teaching, Analyzed by Team Size

Team Size	Hours Spent in Cooperative Teaching per Week				N
	0	1-3	4-10	over 10	
2		3	3	4	10
3	3	1	2	2	8
4		1	1		2
6	1				1
8			1		1

spent in meetings and with knowing what children in teammates' sections are doing. The last correlation is not surprising. It does not correlate at all with team size, although it was originally hypothesized that medium-sized teams would spend more time in cooperative work than smaller or larger teams. It is suggested that because of the relatively high amount of cooperative teaching in the two-member teams, such teams have the fewest organizational problems.

More sophisticated measures are needed to capture what one can call teacher cooperation. These measures should then be applied to different types of teams (e.g., teams in self-contained classroom schools, hierarchical teams, collegial teams) in order to grasp the qualitative differences among them.

CHAPTER VII

QUALITATIVE OBSERVATIONS

Previous chapters have analyzed the data obtained during the study. What follows are qualitative impressions that may help one understand the formal results. Of particular importance is the finding of the very wide variation within the samples of open-space and self-contained classrooms. The discussion that follows is organized into six areas: Use of Space, Noise, Cooperation among Teachers, Groupings of Children, Movement and Other Child-Initiated Behavior, and Principal-Teacher Relations.

Use of Space

In both open-space and self-contained classrooms there were examples of imaginative and stultifying uses of space. Many of the self-contained classrooms used straight rows of chairs; others, however, had resource centers along the walls and children sitting together in small groups. One teacher used a small piece of carpet to designate a space used for children during class discussions and stories. This teacher managed to have all the resources of a pod within her conventional classroom, with the exception of the presence of other adults.

Within any one pod of an open-space school, there was usually little variation. However, the variation between pods was enormous. A typical pod contained a number of sections, each rather smaller than the average self-contained classroom, and a common central space. In some schools, this common space was incorporated into the sections; in some it was reserved for students or groups working on their own; some pods used it as a library or resource area; and in several cases the space was not used at all. (In two such pods the teachers complained of lack of space!) Within a section there were the same two basic patterns seen in the self-contained classroom: the chairs were either in neat rows facing the blackboard or grouped around small tables. Typically, the library of an open-space school was also used as a resource area for children who wanted to work quietly somewhere; this was not the case in the self-contained-classroom schools. In the open-space classroom there was an

attitude of readiness to let children go on their own; mothers or librarians seemed readily available; and the library was accessible from the pods (where this was not so, its use was much more restricted). In one quite exceptional open-space school, even the principal's office, the teachers' lounge, and the nurse's room served as quiet areas where children could work. On my arrival the principal apologized to a second-grader working in his office, "I am sorry. I have to ask you to find another spot to work, since I would like to talk to Mrs. Salmon a bit. Why don't you check in the nurse's office or the teachers' lounge?"

Noise

Noise is a major problem in the open-space school. There are no physical boundaries for a class of students or an individual teacher. Even when one group works in complete silence, the background humming from other groups is still present. The teacher as well as the children learn to cope with this situation. Quite often they schedule noisy activities at the same time, but interference cannot be completely avoided by scheduling. Either one has the rule that everybody keeps very quiet or the teachers learn to respond to interference without anger. The writer observed one pod with 240 students where all noise was subdued, where the children were placed tidily in their classroom areas, and where there was a total lack of excitement. In another pod of four, one teacher was showing a film, and a second teacher was trying to listen with her group of twenty students to a book report. At first, the students sat very closely around their peer who was reporting, but the noise from the film was still too disturbing; so the teacher quickly took all of them to the library where the book report proceeded undisturbed.

The silence that can be found in some self-contained classrooms (as well as in at least one observed team) was such that the observer had to hide the stopwatch in her pocket in order to muffle its click. In several classrooms even this was inadequate, and children became quite curious about where the click came from. When this curiosity was

aroused, differences between children of different classrooms were striking. Some wondered and whispered among themselves and did not ask either the teacher or the observer. Whenever the observer was asked, she gave them a quick explanation and showed them the watch; this procedure was usually effective in preventing further distraction. In other cases children asked the teacher, in discrete whispers, what the click was. Usually, however, there was no need to disguise the click. In most classrooms some children detected the stopwatch in the observer's hand, came up, asked about it, and went away undisturbed. In some cases there was so little attention paid to the observer that nobody was disturbed or asked about the watch at all.

A particularly important feature of all the open-space schools visited was carpeting. The administrators found that it not only made cleaning cheaper, but it reduced noise levels dramatically and made the floor into a functional play and sitting area. When visiting self-contained classrooms without carpeting, all the observers were struck by the dramatic increase in noise caused by movement of any kind. The noise factor may well contribute to the much lower average level of movement in self-contained-classroom schools discussed in Chapter V.

Cooperation Among Teachers

It is true that if a team teacher wishes to change his plans he will usually need to check with his teammates, but this seemed to occur quite regularly without causing any major problems. On one occasion when observers were present, a team scheduled music from 1:00 to 1:20, to be followed by social studies. The music was considered to be in need of improvement for a forthcoming show, so with easy flexibility social studies was postponed. On another occasion, one teacher did not get her children settled until fairly late; after she quickly checked with her teammates, all the teachers directed their students to go back to the same (math) groups after recess for an extra 20 minutes or so.

Groupings of Children

Generally a team varies the grouping of the students several times during the school day. The way in which this grouping, or division of

labor, is handled, was of specific interest. Some qualitative observations are more informative in this respect than the data.

Most teams observed divided their students into achievement groups for reading and mathematics, and formed heterogeneous groups for all other subjects. Once this initial grouping was achieved, some teams simply devised a schedule for shifting the children at the appropriate times to the appropriate teachers. In some cases all teachers taught all subjects, and the grouping basically helped reduce the differences between children being taught by each teacher. In other cases, teachers had specialized in subjects, and the system was like that in a junior high school. This was not, however, the most sophisticated grouping procedure observed. In some pods the exchange of students for certain subjects was standard procedure, and all teachers within the pod were on the same block time schedule. In one school everything stopped three times a day, children got ready to run, and at the sound of the bell they all dashed to their appropriate sections. In the same school, a very rare kind of division of labor was observed with one three-member team; its working may be seen in the way they taught math. All their students were spread out in their team areas, working either alone or in groups. Groupings had apparently not been made according to level of achievement in math. The three teachers walked through the whole area and were not stationed in sections; they pulled students together from the whole group as it seemed appropriate and worked with them. Each of the three specialized in a different area: one worked on division and had prepared materials for demonstrations; one worked on multiplication; and one worked on problems. The children's workbooks were color coded to make it easier for the teachers to see what each child was doing. The teachers believed that they had finally overcome the problem of constantly rescheduling children into different groups.

Surprisingly, one of the biggest obstacles to scheduling observation days was the showing of films--especially in open-space schools. Teachers showed so many films that they did not want to promise two weeks ahead a day without one, and quite frequently we had to reschedule for

this reason. (The writer could not help but be impressed by the amount of watching the average child does--especially if one includes television time at home.)

Movement and Other Child-Initiated Behavior

When the rules and learning activites do not allow children to move, it seems that they find a way to move anyway! During our observations, the water fountain, the wastepaper basket, and the pencil sharpener all served as excuses for movement and socializing. One can sharpen a pencil over and over again if that is a way of talking to a friend who is waiting for his turn, or of annoying him if that would cause excitement. A piece of paper can be torn into many little pieces, and a trip taken to the wastepaper basket with each one, with time out for playing or fighting with peers en route. Typically, such behavior escalated until the teacher intervened.

With other children the extra energy was expressed in talking and sending messages. In one classroom where the teacher demanded that the children sit still, a note was given to the observers reading, "We like you," with a nice picture attached. During recess the children asked what we were doing; when we told them we were interested in seeing what they were doing during the school day, they responded with: "Oh, it's pretty bad, isn't it?"

In one classroom the children were working on their own project with their chosen partners. The children literally ran to fetch materials needed to get the work done. One observer overheard a conversation between two students about a place to work on their project. The argument was very rational, finally ending in a compromise. The first boy wanted to work right in the middle of the classroom. The second boy found this too disturbing because of other children; he wanted to go to a corner separated by moveable walls so as to be alone. The compromise was to use a table in the library adjacent to the classroom, where the first could still see the other children and the second could remain undisturbed. A very impressive conversation for third graders.

Principal-Teacher Relations

As a rule only two--in exceptional cases, three--teams or self-contained-classroom teachers were selected from any one school, to avoid biasing the results. In retrospect, this appears to have been an unnecessary precaution, since we found that teams and self-contained-classroom teachers differed widely within schools. The comparison of two teams of the same size from one school demonstrates this. One team had an average of 25.3 per cent of its students occupied with Educational Games, Cooperative Work, and Doing, not in Large Groups; in science the proportion in that category was 61.4 per cent. During science 110 movements were scored per 25 children per ten-minute time span. Another team in the same school had 6.8 per cent of its students occupied with Educational Games, Cooperative Work, and Doing, not in Large Groups, with 5.8 per cent during science and 2.5 movements scored per 25 children per ten-minute time span.

Some principals in open-space schools were quite unaware of the practices of their teams, and were astonished to hear certain teachers praised highly by the observers. In one case the principal went to see a team described as outstanding, and related afterward that he agreed with the judgment and had not been aware of the quality of the team's work.

It seemed to the writer that many of the principals in open-space schools were content as long as they saw some grouping of students, some planning of resource centers, and some preparation for an exciting event such as an open house or a field trip. They advised on the logistics of handling the open-space situation, but avoided substantive criticisms where teaching was concerned.

CHAPTER VIII

SUGGESTIONS FOR FURTHER RESEARCH AND DISCUSSION OF POSSIBLE LONG-RANGE EFFECTS OF THE ACTIVE CLASSROOM

Implications of the Findings for School Design

This study documented the hypothesis that the school environment experienced by the student is affected by school organization. An Active Classroom was more likely to be found in an open-space team-teaching school than in a self-contained classroom. Moreover, teams with three or four members tended to have more activity in their classrooms than teams with two members. If administrators wish to encourage the existence of such Active Classrooms, the building of open-space schools could be appropriate.[1]

The tendency of large teams to divide into several smaller teams indicates that large teams may experience severe organizational problems. The organization of workable teams is likely to be helped by the provision of "flexible" buildings. If the walls are movable, the internal structure of the pod can be adapted to changes in team organization. A team is likely to benefit from being somewhat isolated acoustically from other teams; it is also helped if children have plenty of space in which to move, and if other teams are physically and visually close enough to encourage cooperation among teams. It is possible to build a pod for six or eight teachers with walls that are both fairly soundproof and movable; if the walls of a team area are not completely closed, but leave a center area free, the teachers lose few of the advantages of open space but gain in the reduction of noise (and extra space for use as bulletin boards).

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[1] In all of about fifty open-space classrooms known to the writer, the teachers formed themselves into some kind of a team. The clear implication is that open-space structure leads to teaming and that the classroom will be relatively Active.

Refinement of the Research

It is left for future researchers to identify just how the combination of team teaching and an open-space architecture leads to an Active Classroom. In spite of the speculations above, the effects of architecture on the working of teams are not yet determined. Thus, it is not known if there is a qualitative difference between teaming in an open-space school and teaming based on self-contained classrooms. It would also be desirable to know how the isolation of teams from one another or its opposite, the existence of several teams within one pod, affects cooperation within teams and among teams. Team cooperation was not adequately measured in this study. The degree and the type of cooperation does seem to affect classroom Activity, but clearly cooperation can take many forms, and different kinds of cooperation (e.g., collegial as against hierarchical teaming) are likely to affect classroom Activity differently.

The data showed that the size of the team correlated with the teaching techniques used by the teacher. An increase of team size seemed to make it easier for the teachers to have more students involved in Doing activities and fewer Large Group presentations. It can be asked, more generally, whether it is easier for complex teaching techniques to be adopted by larger teams, than by small teams or the teacher isolated in a self-contained-classroom.

It would be desirable to look further into the nature and degree of teacher cooperation and the way it affects both the teaching techniques used and, ultimately, the student. Such research could be extremely valuable to school administrators and principals, as well as to team leaders and others concerned with school organization.

Long-Range Effects of the Active Classroom

The study has shown that some determinants of an Active Classroom are definable. Administrators can therefore consciously plan to create or avoid an Active environment. It is difficult to do so, however, without knowing the effect of an Active Classroom on the student. In particular, data should be obtained directly from students on how they perceive their role in an Active Classroom. Does the student feel any

greater autonomy over his own learning? To what degree does he consciously choose and evaluate different learning activities? Do students in the two school types differ in their attitudes toward school, the teachers, and themselves?

It is possible that the Active Classroom, which gives the child choices, opportunities to work independently, and encouragement to be active, makes him feel that he has more control over his environment and that this feeling, in turn, may affect his expectations of the school. Students who become used to such opportunities in lower grades may demand them in upper grades as well. The data indicate developments toward more Active classrooms in upper grades in open-space team-teaching schools as compared to self-contained classrooms. One can easily argue that this will affect the student's expectations of secondary and higher education.

It has been found (Meyer et al., 1971) that teachers in open-space team-teaching schools feel greater autonomy and influence, are more child-oriented and are less curriculum-oriented than those in self-contained classrooms. The combination of this change in teacher orientation combined with the possible change in student expectation could lead to the child's actually becoming a main "client" of the school along with today's clients: parents and society in general.

If society and the parents were to cease to be the major clients of the school, significant changes could follow. The curriculum could become more responsive to the immediate demands of students, possibly tending toward elective courses. With current developments in technology, most instruction could be programmed or computerized, while the teacher might become a guide and counselor, advising the child on what studies to pursue. Like the university, the school might cease to act in loco parentis, but might nevertheless accept greater responsibility for the emotional and intellectual development of its students. Such a change in the school's clientele could, however, put the school into as complicated a political situation as it has already put the university.

These ideas are highly speculative, but trends are already evident. If schools are not to react blindly to new pressures, more research into the impact of innovations in education is needed.

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APPENDIX A

OBSERVATION PROCEDURES, QUESTIONNAIRES, AND A NOTE ON THE FURTHER DEVELOPMENT OF THE CLASSROOM OBSERVATION INSTRUMENT

School/Team/Teacher:_____ Observer ID:_____ # Children ____ ____ ____

Date:_____ Scheduled Activity:_____ Minutes Obs'd ____ ____ ____

	Alone	Std - Std	Sm Gp w/o Ad	Sm Gp & Ad	Tutorial	Large Group	Totals
Reading Writing Discussing							
Waiting Listening Passive							
Educ. Gme Coop Work "Doing" Report to group							
Free Play Social Talk							
Deviant							
Total							

MOVEMENTS x indicates outside section. Total # outside:

Directed	Task & Non-Directed	Non-Task	Deviant	Total

Observation Manual

Follow these steps carefully!

1. Arrive 15 minutes before start of scheduled session.

2. Introduce yourself to the teachers.

3. Prepare as many observation sheets as there are teachers in the team with the requested information (I.D. number, Date, Scheduled activity, etc.). Prepare two sheets for each self-contained classroom teacher.

4. During the first five (5) minutes of the session, familiarize yourself with the room layout (e.g., find where children are hiding!).

5. Start your first observation period with the teacher to the left of the door through which you entered. After you finish, leave the area, find the correct sheet for the next teacher, and observe there. When you have observed all team members once, start over again with the first teacher.

6. Stop observing as soon as the teacher asks the children to "finish up" or during the last five (5) minutes of the scheduled session.

7. If the teachers are all together in a central position (e.g., four teachers), and the children are basically in one big group (110 children), divide the group up into approximately equal classroom sizes (four in our case) and observe one at a time.

8. Make sure that you observe one session in every third

team with another observer.

9. If you are interrupted while observing, make a note to that effect, and start a new observation. Please note down under "Field remarks" what happened; I am very interested in anecdotes!

10. Collect at the very minimum five (5) observations per team per session. In the self-contained classroom, where you do not move to a different teacher after each observation, stop for two to three (2 to 3) minutes before you start the next observation.

11. Classes which meet too short a time for five (5) observations will be observed in two sessions of the subject concerned.

How and What to Score

1. Count all the children in the section and fill the number within the space provided. Repeat this when you come back a second or third time; some children may have left in the meantime or arrived late.

2. Scoring of activities. Fill in what children are doing. Be careful not to score a child twice or to overlook one. If they are split up into groups, move swiftly from group to group and score what the child is doing at the moment you look at him. The total of your scores should add up to the number of children you counted as present above (but do not worry about a discrepancy of one or two).

Two situations have to be watched out for:

a) Children who are in a large group but are "doing" something. The temptation to put them in the "alone" column

is great. Being in a "large group" means being clearly directed by the teacher. So, if the teacher is supervising the "doing" activities and monitoring the children, score all on-going activities in the "large group" column. (E.g., a whole class is cutting and pasting exactly the same shapes--but all cut and paste alone!--the teacher is directing the operation and helping individual students. In such a situation, there are usually also a few pupils to be scored under "social talk and free play" or "deviant.")

b) When small groups of children are working cooperatively (e.g., observing, touching, and discussing a rat)--and write down a few notes about what they are observing--score it under "cooperative work" and not under "writing."

3. Scoring of movements. After you have finished filling in the activities and quickly checked the totals, set the stop watch and score movements for three (3) minutes. When you stop observation, stop the watch and write down exactly how many minutes and seconds you observed. Keep it as close as possible to three (3) minutes.

A movement gets one score for each time the child stops, e.g., child gets up and goes to a friend to chat (1 non-task), moves on to bookshelf and picks a book (1 task), teacher asks the child to sit down in his seat (1 directed).

Short, continuous moves (getting up, picking up a sheet of

paper, sitting down) are scored as one (1) move.

Three movements which you will definitely observe are:

a) going to the bathroom: one (1) movement when leaving, "non-task"; one (1) movement when returning--depending on what the child proceeds to do. If the child asks the teacher's permission to go to the bathroom, it will be a "directed" movement.

b) sharpening pencils is a task movement, sometimes with an added non-task movement in the area of the pencil sharpener.

c) throwing away litter into the wastebasket. Here, you will have to use your judgment! The wastepaper basket is a great place around which to socialize. If the child is throwing away some paper in order to get the desk clean, to get the job done, it is a "task movement." If the child is enjoying talking to others at the basket, or uses it obviously as an excuse to walk around the room, it may be categorized as free play or even deviant. (But deviant movements are only those to which the teacher objects!)

You should note the hyperactive child who would drive up the scores out of proportion to the rest of the children in the classroom. He should <u>not</u> receive any scores after the approximate median score of the class (that is, approximately not more than five (5)).

Attitude Questionnaire

The following questions are about children in general. Even though children do differ from each other, please answer these questions with the "typical" child in mind.

The answering categories are: SA= strongly agree; A= agree; U= undecided; D= disagree; SD= strongly disagree.

	SA	A	U	D	SD
1. In general, school children should be allowed a lot of freedom as they carry out learning activities.					
2. A child should obtain the consent of the teacher before moving about in the classroom.					
3. Children are not mature enough to make their own decisions about their learning activities.					
4. Children get distracted when other activities are going on around them.					
5. Most children are capable of being resourceful when left on their own.					
6. Children are unlikely to learn enough if they are frequently moving about.					
7. Children should normally be encouraged to get information from each other instead of asking the teacher.					
8. Children can learn from small group discussion without the help of an adult.					
9. It is good for the child to have his activities scheduled for him.					

Open-space schools

Teacher Questionnaire

1. During a typical week, how many teachers is the average student scheduled to see? _____

2. How many students are placed in other teams for at least one subject? _____

3. How many hours does the team spend in cooperative teaching per week? _____ (Cooperative teaching means planning together for a unit or session, then collectively teaching the unit or session by combining the students or supervising them in cooperatively planned small groups.)

4. Are different teachers in your team responsible for the preparation of different instructional units (e.g., social studies or science) or for the preparation of different parts of the same instructional unit, or both?
   Never _____ Sometimes _____ Frequently _____ Always _____

5. Do you usually know what the children in your team-mates' sections are doing?
   No _____ I have some idea _____ Yes _____

6. During the day, do you know which teacher each child in your pod is assigned to?
   Never _____ Seldom _____ Sometimes _____ Most of the time _____
   Always _____

7. How many times each month does your team meet formally? _____
   How long is each meeting (on the average)? _____

Would you please answer some questions about yourself:

1. How long have you taught (count this year as a full year)? _____
2. How long have you taught in a team (count this year as a full year)? _____
3. How long has your team been together (count this year as a full year)? _____
4. What is your age? _____20-25 _____26-30 _____31-39 _____over 39
5. What would your ideal pod look like?

   Number of teachers _____
   Number of grades _____
   Number of teams within one pod _____
   Number of teachers per team _____
   Number of grades per team _____

Self-Contained Classroom Schools

Teacher Questionnaire

Would you please answer these two questions:

1. How long have you taught (count this year as a full year)? _____

2. What is your age? _____20-25 _____26-30 _____31-39 _____over 39

Open-space schools

Interview Schedule for the Principal

1. How long has the school been in operation (as an open-space school)? _____

2. In each pod, how many teachers are there and how many grade levels are there?

Number of pods	Number of teachers	Number of grades
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

3. How big are your teams now and how many grade levels do you have per team?

Number of teams	with number of teachers	number of grades
____	____	____
____	____	____
____	____	____
____	____	____

4. In each pod, how often do the teachers of the whole pod meet to discuss matters of schedule, noise, etc?

5. Were your teams always the same size they are now? _____
If not, what changes have occurred?

Number of teams	with number of teachers	number of grades
____	____	____
____	____	____
____	____	____

6. When were the subteams formed (if appropriate)?
approximately after _____ year within _____ year

7. When did the team get larger (if appropriate)?
approximately after _____ year within _____ year

8. What would your ideal pod look like?

Number of teachers _____
Number of grades _____
Number of teams _____
Number of teachers per team _____
Number of grades per team _____

9. Field remarks:
(What kind of problems do your teams run into? How often do they come to you for help? How do you help them with their problems?...)

Interviewer Date

Self-Contained Classroom Schools

Interview Schedule for the Principal

1. How long has the school been in operation?

2. Field remarks:
   (What kind of problems do your teachers have? How often do they come to you for help? How do you help them with their problems? ....)

Interviewer _____ Date _____

A Note on the Further Development of the Classroom Observation Instrument

The Classroom Observation Instrument was described in detail in Chapter IV. This section discusses possible refinements following experience with the instrument in the field.

Types of Activity

Deviant. To avoid observer bias it was necessary to give a very precise meaning to the term Deviant. A movement or activity was therefore only described as deviant if it was obviously not approved of by the teacher. In practice, the Deviant category was little used and it could therefore be eliminated in future work; this would, however, involve scoring obviously deviant behavior in some other category, which would therefore reduce precision. For more in-depth studies it might be possible to expand the Deviant category, if the observer were to learn just what behavior the teacher considered deviant.

Free Play and Social Talk. Free Play and Social Talk included certain activities that might have been described as Deviant and others that were very close to Doing. Greater precision would be possible if playful, unstructured learning activities were categorized as Educational Games, Cooperative Work, and Doing, and the existing Free Play and Social Talk were renamed Free Social Interaction. According to the specific purpose of the research, Deviant could then be included with Free Social Interaction.

Large Group. Since the study was concerned with the extent to which children could learn independently, if several children worked on the same

problem, exercise, or activity, they were considered to be a group. For example, 12 children all doing the same math problems were classified as a Large Group. In some studies it might be appropriate to separate these two kinds of work into Large Group and Alone--Common Work. A great deal would be lost, however, if Alone--Common Work were combined with Alone.

Directed movement. All children walking away from the teacher were scored as making Directed movement, even if no explicit instruction was heard. It might be possible to refine this definition if the observer could stand near the teacher and hear what he said--though at some risk of affecting the teacher. In this study the definition used proved consistent and satisfactory.

Task and Non-Task Movement. The difference between Task and Non-Task movement was clear to the observers after a few training sessions, and frequent reliability checks reinforced consistency. If it were impossible to make such checks, it might be preferable to score a single category of Non-Directed movement.

Classroom Boundaries

It was originally planned to note specifically all movement outside the section; this measure was dropped because the inside and outside of an open-space classroom were ill defined.

In a very active classroom where children are not assigned to specific teachers, it can be difficult to decide which are the children whose activities and movements are to be scored. Such a situation can best be scored by using one observer for every 20 to 30 children and dividing the

total space among them. Movements would then be scored only by the observer in whose section they originated. This situation is most unusual, however, and can be treated as it arises.

APPENDIX B

INTERCORRELATIONS OF ITEMS IN THE CONTROL ORIENTATION INDEX, INTERCORRELATIONS OF THE PREDICTOR VARIABLES, INTERCORRELATIONS OF THE KEY DEPENDENT VARIABLES, AND CORRELATIONS C. GRADE LEVEL WITH DEPENDENT VARIABLES

TABLE 1

Intercorrelation of the Items of the Control Orientation Index (Kendall Correlation Coefficients)

	Q1[a]	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9
Q2	-.29***								
Q3	-.29***	.17**							
Q4	-.34***	.25***	.22***						
Q5	.46***	-.14*	-.37***	-.31***					
Q6	-.44***	.23***	.37***	.28***	-.36***				
Q7	.40***	-.25***	-.27***	-.22***	.28***	-.26***			
Q8	.29***	-.21**	-.34***	-.27***	.35***	-.24***	.44***		
Q9	-.34***	.31***	.11	.30***	-.24***	.34***	-.15*	-.13*	
Index[b]	.60***	-.45***	-.49***	-.50***	.52***	-.54***	.49***	.47***	-.46***

Note: The responses are based on a sample of 95 persons, including both teachers and principals.

[a]Q = Question

[b]Index = Sum of all items (items 1,5,7, and 8 are positive; items 2, 3,4,6, and 9 are negative).

*Significant at the 5% level.

**Significant at the 1% level.

***Significant at the 0.1% level.

TABLE 2

Pearson Intercorrelations of Predictor Variables, All Classrooms (N = 33)

Predictor Variable	Principal Formal Control Orientation	Grade Level	Type of School
Teacher Formal Control Orientation	.10	.18	.06
Principal Formal Control Orientation		.00	-.21
Grade Level[a]			.01

Note: None of these Pearson correlations is statistically significant at the .05 level.

[a]In mixed grades, grade level was equated by the average of the grades included; e.g., a class of third and fourth graders had a grade level of 3.5.

TABLE 3

Pearson Intercorrelations of Predictor Variables
in the Open-Space Schools Only
(N = 22)

Variable	Principal Formal Control Orientation	Grade Level	Number of Grade Levels per Team	Team Size	Team Size Dichotomized[b]	Hours of Coop. Teaching per Week
Teacher Formal Control Orientation	-.08	.48*	.34	.15	-.25	-.39*
Principal Formal Control Orientation		-.01	.07	.25	.26	.06
Grade Level[a]			.51**	.28	-.06	-.02
Number of Grade Levels per Team				.48*	.30	.00
Team Size						-.15
Team Size Dichotomized[b]						.13

[a]In mixed grades, grade level was put equal to the average grade included, e.g., a class of third and fourth graders had a grade level of 3.5.

[b]Teams of three and four members grouped together, and compared to teams of two members; teams with six and eight members (N = 20) are not included.

*Significant at .05 or less.

**Significant at .01 or less.

TABLE 4

Pearson Intercorrelations of the Four Key Measures of the Active Classroom (N = 33)

	Non-Teacher-Directed Movement	Waiting, Listening, Passive	Educational Games, Cooperative Work, and Doing, not in Large Group
Waiting, Listening, Passive	-.60		
Educational Games, Cooperative Work, Doing, not in Large Group	.83	-.60	
Large Group	-.75	.60	-.78

Note: All correlations are significant at the 0.1% level.

TABLE 5

Kendall Correlations Between Grade Level[a]
and Dependent Variables, in
Self-Contained-Classroom Schools and Open-Space Schools

Variables	Self-Contained-Classroom Schools	Open-Space Schools
Activity		
Reading, Writing, Discussing	-.06	-.14
Waiting, Listening, Passive	.29	.01
Educational Games, Cooperative Work, Doing, not in Large Group	-.52*	-.09
Educational Games, Cooperative Work, Doing, in Large Group	-.40*	-.20
Free Play, Social Talk	.21	.21
Deviant	.47*	.12
Learning Group		
Alone	-.33	.01
Student/Student	-.22	-.05
Small Group without Adult	-.24	-.19
Small Group with Adult	-.29	-.04
Tutorial	-.40*	-.13
Large Group	.29	.04
Movement		
Directed Movement	-.33	-.12
Task Movement	-.40*	-.04
Non-Task Movement	-.48*	-.05
Deviant Movement	-.07	.17
Total Movement	-.48*	-.15
Non-Directed Movement	-.52*	-.03
N (Classrooms)	11	22

[a]"Grade Level" is the average grade level present, i.e., a class containing grades 3 and 4 is given a grade level of 3.5.

*Significant at .05 or less.

APPENDIX C

ANALYSES OF MEAN PERCENTAGES OF TIME CHILDREN SPENT IN VARIOUS ACTIVITIES AND GROUPINGS, AND MEAN NUMBER OF MOVEMENTS PER CHILD PER MINUTE BY DIFFERENT PREDICTOR VARIABLES

TABLE 1

Mean Percentage of Time Children Spent in Various Activities and Various Groupings, and Mean Number of Movements per Child per Minute, Analyzed by Type of School

	Self-Contained Classrooms	Open-Space Classrooms
Mean percentage of time children spent in various activities		
Reading, Writing, Discussing	47.8	51.5
Waiting, Listening, Passive	34.7*	24.3
Educational Games, Cooperative Work, Doing, not in Large Group	4.7*	9.4
Educational Games, Cooperative Work, Doing, in Large Group	4.4	4.4
Free Play, Social Talk	8.1	10.0
Deviant	0.3	0.5
Mean percentage of time children spent in various groupings		
Alone	18.1	26.5
Student/Student	3.5	6.8
Small Group with Adult	9.9	11.2
Small Group without Adult	6.3	10.1
Tutorial	1.7	1.9
Large Group	60.5*	43.3
Mean number of movements observed per child per minute		
Directed Movement	.023*	.044
Task Movement	.062**	.115
Non-Task Movement	.028**	.060
Deviant Movement	.001	.001
Total Movement	.114**	.220
N (Classrooms)	11	22

*Difference significant at .05 or less
**Difference significant at .01 or less
(one-tailed t-test, 31 degrees of freedom)

TABLE 2

Mean Percentage of Time Children Spent in Various Activities and Various Groupings, and Mean Number of Movements per Child per Minute, Analyzed by Type of School by Subject

	READING		MATHEMATICS		SOCIAL STUDIES/ SCIENCE	
	S-C	O-S	S-C	O-S	S-C	O-S
Mean percentage of time children spent in various activities						
Reading, Writing, Discussing	54.7	59.0	55.9	56.0	32.8	39.3
Waiting, Listening, Passive	31.9*	22.7	29.3	21.9	42.8*	28.3
Educational Games, Cooperative Work, Doing, not in Large Group	5.8	6.3	3.6	6.2	4.8	15.8
Educational Games, Cooperative Work, Doing, in Large Group	1.8	1.8	0.9	5.0	10.5	6.3
Free Play, Social Talk	5.8*	9.9	10.1	10.8	8.3	9.2
Deviant	0.0	0.2	0.2	0.1	0.8	1.2
Mean percentage of time children spent in various groupings						
Alone	24.3	38.3	22.0	26.3	8.0	15.1
Student/Student	4.6	7.9	2.7	5.9	3.2	6.5
Small Group with Adult	5.5	6.1	14.4	5.8	9.8	21.9
Small Group without Adult	15.4	17.7	1.5	5.0	2.1	7.6
Tutorial	1.3	3.3	3.1	2.2	0.8	0.4
Large Group	48.9	26.7	56.4	54.8	76.0*	48.5
Mean number of movements observed per child per minute						
Directed Movement	.021*	.045	.027	.043	.020	.044
Task Movement	.068*	.108	.081*	.117	.038**	.120
Non-Task Movement	.031*	.057	.033*	.056	.020**	.066
Deviant Movement	.000	.000	.001	.001	.002	.002
Total Movement	.120**	.211	.142*	.218	.080**	.232
N (Classrooms)	11	22	11	22	11	22

S-C: Self-contained classrooms
O-S: Open-space classrooms
*Difference significant at .05 level or less
**Difference significant at .01 level or less
(one-tailed t-test, 31 degrees of freedom)

TABLE 3

Mean Percentage of Time Children Spent in Various Activities and Various Groupings, and Mean Number of Movements per Child per Minute, Analyzed by Subject

	READING	MATHEMATICS	SOCIAL STUDIES /SCIENCE
Mean percentage of time children spent in various activities			
Reading, Writing, Discussing	57.6	56.0	37.1
Waiting, Listening, Passive	25.8	24.4	33.1
Educ. Games) Not Lg. Coop. Work) Group	6.1	5.3	12.1
Doing) Lg. Grp.	1.8	3.6	7.7
Free Play, Social Talk	8.5	10.6	8.9
Deviant	0.1	0.1	1.1
Mean percentage of time children spent in various groupings			
Alone	33.6	24.8	12.7
Student/Student	6.8	4.8	5.4
Small Group without Adult	5.9	8.6	17.9
Small Group with Adult	17.0	3.8	5.8
Tutorial	2.6	2.5	0.6
Large Group	34.1	55.4	57.7
Mean number of movements observed per child per minute			
Directed Movement	.037	.038	.036
Task Movement	.095	.105	.093
Non-Task Movement	.049	.049	.050
Deviant Movement	.000	.001	.002
Total Movement	.181	.193	.181
N (Classrooms)	33	33	33

TABLE 4

Mean Percentage of Time Children Spent in Various Activities and Various Groupings, and Mean Number of Movements per Child per Minute, Analyzed by Teacher Control Orientation and

	TEACHER CONTROL ORIENTATION			Pearson Correlation
	Formal	Middle Group	Informal	
Mean percentage of time children spent in various activities				
Reading, Writing, Discussing	47.1	52.8	48.0	-.23
Waiting, Listening, Passive	32.6	25.8	27.2	.38*
Educational Games, Cooperative Work, Doing, not in Large Group	7.2	6.3	11.8	-.29*
Educational Games, Cooperative Work, Doing, in Large Group	1.8	6.9	1.7	-.01
Free Play, Social Talk	10.5	8.0	11.0	-.08
Deviant	0.9	0.3	0.3	.20
Mean percentage of time children spent in various groupings				
Alone	18.4	24.8	26.8	-.21
Student/Student	2.9	5.2	9.5	-.40**
Small Group without Adult	6.6	9.5	17.8	-.37
Small Group with Adult	11.7	6.7	10.6	.06
Tutorial	1.3	2.3	1.5	-.07
Large Group	59.2	51.4	34.0	.38*
Mean number of movements observed per child per minute				
Directed Movement	.030	.044	.029	-.06
Task Movement	.072	.100	.119	-.41**
Non-Task Movement	.042	.045	.065	-.35
Deviant Movement	.002	.001	.001	.29
Total Movement	.147	.190	.213	-.36*
N (Classrooms)	8	17	8	33

Note: In computation of Pearson correlations, formal Control Orientation was defined to be high.

*Significant at .05 or less

**Significant at .01 or less

TABLE 5

Mean Percentage of Time Children Spent in Various Activities and Various Groupings, and Mean Number of Movements per Child per Minute, Analyzed by Principal Control Orientation, by School Type

	SELF-CONTAINED CLASSROOMS		OPEN-SPACE SCHOOLS	
	Principal Control Orientation			
	Formal	Informal	Formal	Informal
Mean percentage of time children spent in various activities				
Reading, Writing, Discussing	46.0	56.0	52.4	50.8
Waiting, Listening, Passive	37.5	22.2	24.9	23.9
Educ. Games) Not Lg. Coop. Work) Group	3.8	8.9	7.0	11.1
Doing) Lg. Grp.	5.2	1.0	3.4	5.1
Free Play, Social Talk	7.4	11.2	11.4	8.9
Deviant	0.3	0.7	0.9	0.2
Mean percentage of time children spent in various groupings				
Alone	13.8	37.5	25.8	27.1
Student/Student	3.5	3.7	5.8	7.5
Small Group without Adult	8.3	16.9	5.9	14.9
Small Group with Adult	5.1	11.7	9.3	10.7
Tutorial	1.7	1.9	2.0	1.9
Large Group	67.6	28.3	51.3	37.9
Mean number of movements observed per child per minute				
Directed Movement	.019	.037	.036	.050
Task Movement	.053	.104	.108	.120
Non-Task Movement	.022	.056	.052	.066
Deviant Movement	.001	.001	.002	.001
Total Movement	.096	.197	.198	.236
N (Classrooms)	9	2	9	13

TABLE 6

Mean Percentage of Time Children Spent in Various Activities and Various Groupings, and Mean Number of Movements per Child per Minute, Analyzed by Mean Grade Level Taught

	GRADES 1, 2 & 2/3	GRADES 3, 4 & 4/5	GRADES 4/5/6, 5, 5/6 & 6
Mean percentage of time children spent in various activities			
Reading, Writing, Discussing	48.7	54.1	47.9
Waiting, Listening, Passive	28.2	22.9	32.2
Educ. Games) Not Lg. Coop Work) Group	8.0	9.6	6.0
Doing) Lg. Grp.	7.1	3.6	2.4
Free Play, Social Talk	7.7	9.3	11.0
Deviant	0.4	0.4	0.5
Mean percentage of time children spent in various groupings			
Alone	25.5	25.1	20.6
Student/Student	5.1	7.1	4.9
Small Group without Adult	12.3	13.1	7.0
Small Group with Adult	9.7	8.3	8.6
Tutorial	2.6	1.9	1.2
Large Group	44.9	44.6	57.7
Mean number of movements observed per child per minute			
Directed Movement	.061	.020	.030
Task Movement	.114	.096	.082
Non-Task Movement	.053	.052	.043
Deviant Movement	.001	.001	.001
Total Movement	.229	.171	.155
N (Classrooms)	11	11	11

TABLE 7

Mean Percentage of Time Children Spent in Various Activities and Various Groupings, and Mean Number of Movements per Child per Minute, Analyzed by Mean Grade Level Taught, by Subject

	READING			MATHEMATICS			SOCIAL STUDIES/ SCIENCE		
Grade Level:	1-2	3-4	5-6	1-2	3-4	5-6	1-2	3-4	5-6
Mean percentage of time children spent in various activities									
Reading, Writing, Discussing	56.3	63.2	53.2	53.8	59.7	54.5	35.9	39.5	36.0
Waiting, Listening, Passive	24.4	20.5	32.5	20.5	24.1	28.6	39.8	24.0	35.4
Educ. Games) Not Lg. Coop. Work) Group	7.3	7.4	3.7	7.5	5.5	3.0	9.2	15.9	11.2
Doing) Lg. Grp.	2.3	2.0	1.2	9.1	0.7	1.0	9.8	8.2	5.1
Free Play, Social Talk	9.6	6.8	9.2	9.1	9.9	12.7	4.3	11.3	11.2
Deviant	0.1	0.1	0.3	0.1	0.1	0.2	0.9	1.1	1.1
Mean percentage of time children spent in various groupings									
Alone	38.5	35.5	26.8	27.9	27.5	19.1	10.2	12.2	15.8
Student/Student	6.3	8.2	5.9	5.8	7.1	1.6	3.1	5.9	7.3
Small Group without Adult	8.2	4.2	5.3	12.6	3.8	9.5	16.1	31.2	6.3
Small Group with Adult	19.1	14.4	17.4	5.6	3.4	2.5	4.4	7.2	5.8
Tutorial	4.8	1.4	1.6	2.7	3.3	1.4	0.3	0.8	0.5
Large Group	23.2	36.3	43.0	45.4	54.9	65.8	66.0	42.7	64.3
Mean number of movements observed per child per minute									
Directed Movement	.062	.017	.032	.055	.026	.032	.065	.018	.025
Task Movement	.118	.089	.077	.124	.108	.083	.100	.092	.086
Non-Task Movement	.059	.045	.042	.048	.064	.034	.051	.048	.052
Deviant Movement	.000	.000	.001	.000	.001	.002	.002	.002	.001
Total Movement	.240	.152	.151	.228	.200	.150	.219	.161	.164
N (Classrooms)	11	11	11	11	11	11	11	11	11

TABLE 8

Mean Percentage of Time Children Spent in Various Activities and Various Groupings, and Mean Number of Movements per Child per Minute, Analyzed by Number of Grade Levels Taught by Team, Open-Space Schools Only

	1 GRADE LEVEL TAUGHT BY TEAM	2- AND 3- GRADE LEVELS TAUGHT BY TEAM
Mean percentage of time children spent in various activities		
Reading, Writing, Discussing	51.4	51.6
Waiting, Listening, Passive	21.4	29.5
Educ. Games) Not Lg. Coop. Work) Group	11.4	5.9
Doing) Lg. Grp.	5.5	2.4
Free Play, Social Talk	10.0	9.9
Deviant	0.4	0.7
Mean percentage of time children spent in various groupings		
Alone	27.5	24.9
Student/Student	8.6	3.7
Small Group without Adult	14.3	5.9
Small Group with Adult	10.0	10.3
Tutorial	2.0	1.8
Large Group	37.6	53.4
Mean number of movements observed per child per minute		
Directed Movement	.050	.034
Task Movement	.124	.100
Non-Task Movement	.068	.046
Deviant Movement	.001	.001
Total Movement	.243	.181
N (Classrooms)	14	8

TABLE 9

Mean Percentage of Time Children Spent in Various Activities and Various Groupings, and Mean Number of Movements per Child per Minute, Analyzed by Number of Grade Levels Taught by Team, by Subject, in Open-Space Schools Only

	Reading		Mathematics		Social Studies/ Science	
	Number of Grade Levels					
	1	2/3	1	2/3	1	2/3
Mean percentage of time children spent in various activities:						
Reading, Writing, Discussing	60.3	56.7	53.8	60.0	40.0	38.2
Waiting, Listening, Passive	18.3	30.5	21.7	22.3	24.1	35.7
Educ. Games) Not Lg. Group	7.8	3.6	6.4	5.7	20.0	8.3
Coop. Work) Group						
Doing) Lg. Grp.	2.3	1.0	6.5	2.3	7.7	3.9
Free Play, Social Talk	11.0	8.0	11.5	9.6	7.5	12.1
Deviant	0.1	0.2	0.1	0.1	0.9	1.9
Mean percentage of time children spent in various groupings						
Alone	42.3	31.3	25.5	27.8	14.7	15.7
Student/Student	10.1	4.1	7.3	3.6	8.3	3.5
Small Group without Adult	8.1	2.4	6.5	4.5	28.3	10.6
Small Group with Adult	15.0	22.5	4.4	6.0	10.6	2.4
Tutorial	3.8	2.2	1.8	2.9	0.5	0.2
Large Group	20.6	37.5	54.6	55.3	37.5	67.6
Mean number of movements observed per child per minute						
Directed Movement	.050	.037	.049	.033	.051	.031
Task Movement	.114	.099	.120	.112	.139	.088
Non-Task Movement	.068	.040	.062	.047	.074	.052
Deviant Movement	.000	.000	.000	.002	.002	.001
Total Movement	.232	.175	.231	.194	.266	.172
N (Classrooms)	14	8	14	8	14	8

TABLE 10

Mean Percentage of Time Children Spent in Various Activities and Various Groupings, and Mean Number of Movements per Child per Minute, Analyzed by Teacher Report of Hours Spent per Week in Cooperative Teaching, Open-Space Schools Only

	0 - 3 HOURS COOPERATIVE TEACHING	4 - 10 HOURS COOPERATIVE TEACHING	MORE THAN 10 HOURS COOPERATIVE TEACHING
Mean percentage of time children spent in various activities			
Reading, Writing, Discussing	47.4	54.6	53.1
Waiting, Listening, Passive	28.2	23.4	20.7
Educ. Games) Not Lg. Coop. Work) Group	7.3	8.6	12.7
Doing) Lg. Grp.	6.0	4.9	1.9
Free Play, Social Talk	10.4	8.3	11.2
Deviant	0.8	0.2	0.4
Mean percentage of time children spent in various groupings			
Alone	20.9	29.6	30.0
Student/Student	6.4	4.6	9.4
Small Group without Adult	12.0	5.9	15.7
Small Group with Adult	10.0	10.6	9.9
Tutorial	1.3	2.7	1.9
Large Group	49.5	46.6	33.1
Mean number of movements observed per child per minute			
Directed Movement	.048	.049	.034
Task Movement	.102	.100	.146
Non-Task Movement	.057	.049	.073
Deviant Movement	.002	.001	.002
Total Movement	.209	.199	.255
N (Classrooms)	8	7	7

TABLE 11

Mean Percentage of Time Children Spent in Various Activities and Various Groupings, and Mean Number of Movements per Child per Minute, Analyzed by Number of Teachers in Team

	SELF-CONTAINED CLASSROOMS	2-MEMBER TEAMS	3- AND 4-MEMBER TEAMS	6- AND 8-MEMBER TEAMS
Mean percentage of time children spent in various activities				
Reading, Writing, Discussing	47.8	52.2	49.7	56.9
Waiting, Listening, Passive	34.7	26.3	23.0	20.8
Educ. Games) Not Lg. Coop. Work) Group	4.7	8.2	11.8	3.8
Doing) Lg. Grp.	4.4	5.9	2.9	4.4
Free Play, Social Talk	8.1	7.2	12.0	13.6
Deviant	0.3	0.3	0.7	0.6
Mean percentage of time children spent in various groupings				
Alone	18.1	26.5	26.7	25.7
Student/Student	3.5	5.0	9.2	3.5
Small Group without Adult	9.9	9.6	14.5	3.2
Small Group with Adult	6.3	9.4	12.0	4.6
Tutorial	1.7	2.3	1.8	1.1
Large Group	60.5	47.1	35.8	62.0
Mean number of movements observed per child per minute				
Directed Movement	.023	.061	.027	.044
Task Movement	.062	.117	.117	.097
Non-Task Movement	.028	.054	.069	.045
Deviant Movement	.001	.001	.002	.001
Total Movement	.114	.232	.215	.188
N (Classrooms)	11	10	10	2

APPENDIX D

SAMPLE OF FEEDBACK TO PARTICIPANTS IN THE STUDY

SCHOOL OF EDUCATION
STANFORD UNIVERSITY

STANFORD CENTER FOR RESEARCH AND
DEVELOPMENT IN TEACHING

770 Welch Road, Palo Alto, California 94304
Area Code 415
321-2300 ext. 4717

2 September 1971

Dear Teacher or Principal:

This letter is to thank you for the help you gave me last Spring while I was gathering data in your school, and to give you some feedback on the information I collected.

Enclosed you will find a summary of the main findings of the study, a sheet giving six small charts, a sheet about a "Control Orientation" Index, and another sheet giving a lot of very detailed figures. The six charts show how your team scored on six basic measures of what your children were doing during our observations--these measures are described in the summary. Your scores are compared to the averages of the eleven self-contained and twenty-two open-space classrooms that were observed. (If you are a principal, you only get the two averages, and not the scores for your teachers.)

The charts are very simple measures and are averages over Reading, Mathematics and Social Studies or Science. A full summary of the observations in your classroom is given on the sheet with detailed figures, again compared to the averages for the two kinds of classroom studied.

The "Control Orientation" Index is mentioned in the summary and is described in more detail on the enclosed sheet. The Index was calculated from your answers to our questionnaire; the sheet reports your score on the Index.

To my surprise (!), virtually all the data from the study gave clear results. The results are particularly useful as a basis for future research by the Environment for Teaching Project, for which I have been working. The identification code for your classroom, however, will be destroyed after you receive this feedback. Therefore, once again, many thanks for your cooperation.

If you have any questions or would like to discuss this further, please contact the Environment for Teaching Program at the above address and telephone number. The full report will come out as a Technical Report from the Stanford Center for Research and Development in Teaching sometime in 1972. If you are interested in seeing it, please contact Mr. Bruce Harlow, Dissemination Coordinator, at the above address.

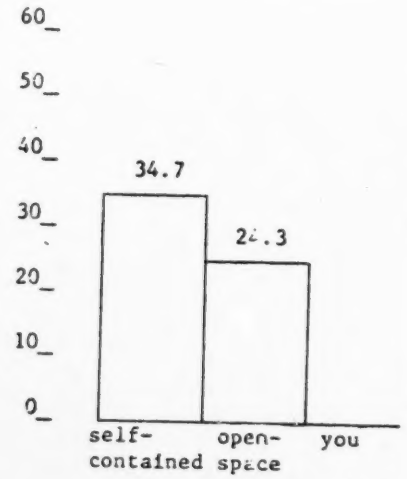
Yours sincerely,

Erika Lueders-Salmon

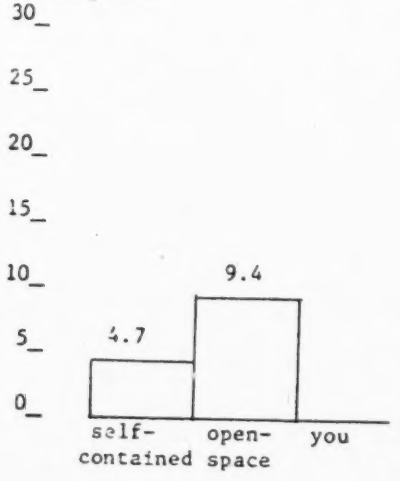
Erika Lueders-Salmon

ELS/jki
encls.

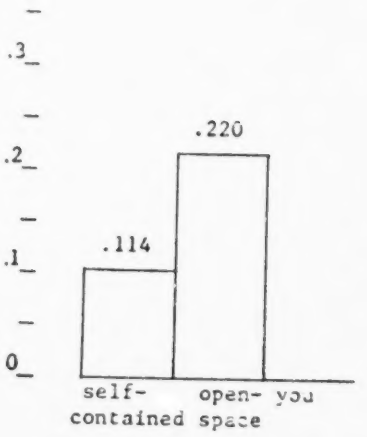
% of time children spend "Waiting, Listening and Passive" averaged over three subjects



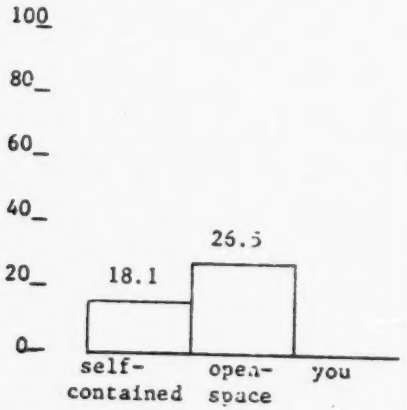
% of time children spend in "Educ. Games, Cooperative Work and Doing, not in Large Group" averaged over three subjects



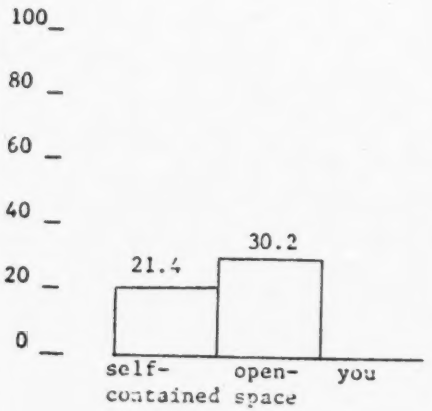
Total number of movements per child per minute, averaged over three subjects



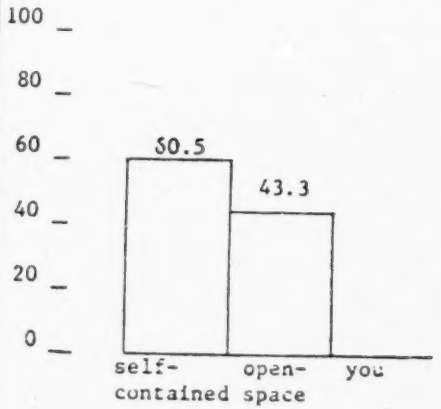
% of time children spend "Alone", averaged over three subjects



% of time children spend in "Small Group", averaged over three subjects



% of time children spend in "Large Group", averaged over three subjects



Scores on the "Control Orientation" Index

Each * represents one team or one teacher from a self-contained classroom. Your score is circled.

This index was designed to find out how teachers feel about having more or less controlled classrooms. E.g. you were asked whether you agreed or disagreed with the statement "In general, school children should be allowed a lot of freedom as they carry out learning activities". Teachers who strongly disagreed with this and similar questions received a high score on the index and are described as having a formal "Control Orientation"; teachers who received a low score are described as having an informal "Control Orientation". For teams, a score was obtained by averaging the scores of its members. There were no significant differences between the scores of teachers from self-contained classrooms and those from open-space schools.

Classroom Observations for Reading, Mathematics and Social Studies/Science for Open-Space schools, Self-Contained classrooms and your classroom

	READING			MATHEMATICS			SOC. STUD./SCIENCE		
	s-c	o-s	you	s-c	o-s	you	s-c	o-s	you
Mean Percentage of time children spend in various activities									
Reading, Writing, Discussing	54.7	59.0		55.9	56.0		32.8	39.3	
Waiting, Listening, Passive	31.9	22.7		29.3	21.9		42.8	28.3	
Educ. Games, Coop. Work, Doing } Not in Large Group	5.8	6.3		3.6	6.2		4.8	15.8	
Educ. Games, Coop. Work, Doing } in Large Group	1.8	1.8		0.9	5.0		10.5	6.3	
Free Play, Social Talk .	5.8	9.9		10.1	10.8		8.3	9.2	
Mean Percentage of time children spend in various groupings									
Alone	24.3	38.3		22.0	26.3		8.0	15.1	
Small Groups	26.8	35.0		21.6	18.9		16.0	36.4	
Large Groups	48.9	26.7		56.4	54.8		76.0	48.5	
Mean number of movements observed per 25 children per ten minute time span									
Number of movements	30	53		35	54		20	58	

Notes: o-s Open-Space Schools; s-c Self-Contained Classrooms.

"Alone" includes children working individually and independently

"Small Group" includes groups of up to ten children; "Large Group" over ten.

"Group" situations also include occasions when a number of children are working individually on the same work -- e.g. all on the same mathematics problem.